GLOBAL NARRATIVES AND THE VULNERABLE FRONTIERS: A CRITICAL ASSESSMENT OF GLOBAL CLIMATE CHANGE COMMUNICATION PROCESSES AND TRADITIONAL RETENTIONS

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ABSTRACT

Contemporary ecological issues compound environmental communications' primary challenge of raising public consciousness and effectively mobilizing agency to mount robust systemic and practical actions. This fundamental challenge persists amidst capitalist enclosure that exacerbates anthropogenic climate change in a manner that indicts current models of macrosocietal planning (Steffen, 2011; Garnaut, 2008). Yet, "we know little about our capacity to raise public consciousness and therefore incite reparatory actions" in the environmental domain (Foxwell-Norton & Lester, 2017). This is most consequential in resource-dependent communities, the frontiers of climate impact. Critical aspects of life, including subsistence on rainfed agriculture, are manifestly undermined by current and projected climate change related impacts. Given the urgent existential implications of inaction or even inadequate action, this study seeks to optimize climate change communication in accordance with transformative and reparatory consciousness. It links the field of climate change communications with critical perspectives in Communication for Social Change and integrates the reparatory notion of climate justice to explicitly highlight the ethico-political terrain on which communicative actions must be directed to be commensurate with the distinct variability, high degree of permanence and multidimensionality of anthropogenic challenges.

The comparative and cross-cultural study is based on a representative purposive sample of 300 drawn from across 17 indigenous and traditional villages in Fiji, India and Belize that typifies heightened and disproportionate levels of vulnerability. It employs a socio-cultural elicitation and analytical framework to delineate and probe climate change perception, disposition and actions across 14 dimensions with keen attention to contextually variable group membership, alongside standard demographic variables. Probing these interpretive communities

uniquely illuminates how discrete group membership structures climate disposition. It also highlights contextual intervention levels for knowledge improvement and mobilization generally and across specific dimensions, including religious and nature-oriented fatalism, discrete motives and potential sources of leadership.

Definitively, it offers globally relevant recommendations for optimizing communication processes in resource-dependent communities across three pathways: coping, resilience and transformation. This is premised on comparative analysis of the findings of the socio-cultural elicitation process against climate change communication's general acceptance of core communication principles regarding risk perception, message construction, resonance, motive, intervention levels and engagement frames.

DEDICATION

This work is in honour of my maternal family, the Williamses of Mount Olive and the Palmers of Glengoffe, both in the parish of Saint Catherine, Jamaica. Their lifelong dependence upon the natural environment, collective ownership of land, generations of subsistence farming and skillful jippi-jappa crafting enriched me with joy and purpose in my formative years. Utmost thanks to Icilda Palmer, née Williams, my only surviving grandparent, and my late grandaunt Lillian 'Lyn' Williams. Aunty Lyn showed me incomparable affection and was most explicitly invested in my pursuit of doctoral studies. My family's courage, customs and love inculcated the innate appreciation I hold for life's interconnectedness, which this project seeks to safeguard.

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Chapter One: Introduction

Contemporary ecological issues compound environmental communications' primary challenge of raising public consciousness and effectively mobilizing agency to mount robust systemic and practical actions. This fundamental challenge persists amidst capitalist enclosure that exacerbates anthropogenic climate change in a manner that indicts current models of macrosocietal planning (Steffen, 2011; Garnaut, 2008). Yet, "we know little about our capacity to raise public consciousness and therefore incite reparatory actions" in the environmental domain (Foxwell-Norton & Lester, 2017). This communicative conundrum is rooted in the atomistic approach to climate change at both policy and programmatic levels (Adger, Paavola, & Huq, 2006; Agyeman, Doppelt, Lyn, & Hatic, 2007; Cohen et al., 1998). Particularly, the global response to climate change over the last 30 years has been overwhelmingly defined by technical considerations—an array of climate modelling and adaptation initiatives. Conversely, little progress has been made in critically assessing communication processes despite the primacy communication is given in Article 6a of the United Nations Framework Convention on Climate Change for building support and promoting action.

In the absence of a consistent research agenda until 2010 (Moser, 2017), climate change communication efforts have been dominated by information and education campaigns that seek to influence the public's behaviour. Chief among the persuasive behavourist turn in climate change communications is the deployment of social marketing. The technique involves "the application of marketing technologies developed in the commercial sector to solve social problems" (Andreasen, 1995, p3), to enable pro-environmental social changes. Some scholars contend that the transtheoretical nature of this approach renders it suitable for a range of social domains other than health, with which it is more widely associated (Darnton, 2008). While the

technical and persuasive orientation of this approach is pronounced in the literature on information campaigns, the evidence suggests that convincing people of possible negative consequences associated with their actions is insufficient to motivate action (Caribbean Community Climate Change Centre (CCCCC), 2012). These campaigns have therefore had mixed results, and a plurality of people still do not understand how climate change affects them, and how their way of life is connected to it as both causational and consequential factors.

The consensus in the emergent field of climate change communications, a corollary laggard to the science and policy debates since emerging in the mid-1990s, is that the communicative challenges are caused by the phenomenon's fundamental distinctions. The differentiating factors believed to produce unique challenges for the communicability of climate change include the scale of current and projected impacts, differentiating vulnerability to impacts both geographically and temporally, rate of onset, perceptibility, multidimensionality and a degree of permanence (Diamond, 2005, cited in Pelling, 2011; Galloway McLean, 2010; Steffen, 2011). Accordingly, a discrete field has evolved to mount a concerted response to these fundamentally distinct challenges. However, this emergent field is largely driven by urgent needs noted through praxis, and contributions from a range of disciplinary interests that accounts for its theoretical and empirical support. Its primary observations and rationale emanate from widely different contexts, which undermines confidence about their applicability, especially because they have not been widely tested (Moser & Dilling, 2007).

Additionally, the pursuit of a discrete practice imbues the fledgling field with an instrumental orientation, primarily concerned with optimizing communicative modalities. Specifically, the field's primary focus on facets of engagement, values, culture, cross and sub-cultural perceptions, accessibility, among other aspects, for the crafting of effective frames.

While of high import, the privileging of resonance and communicability without explicitly seeking to tap communication's broader transformative affordances is indicative of the field's corollary genesis and association with a resilient techno-scientific paradigm. The narrow conceptualization of communication's role in addressing anthropogenic climate change results in the negation of the core problem: the capitalist logic underpinning society's construction and dependence on fossil fuel, the primary cause of anthropogenic climate change. Both the lack of an explicit ethico-political consciousness and the paucity of testing of insights in the primarily western and cosmopolitan literature on climate change communication are consequential. This is heightened by the fact that it is replete with discrete consumption-oriented cases, particularly energy conservation and recycling initiatives (Maibach, Roser-Renouf & Leiserowitz, 2008). These cases offer insufficient guidance on how to boost the adaptive capacity of the most vulnerable because climate change induced challenges have differentiated impacts, are permanent, multidimensional and consequently require long-term and deeper engagement than time-bound communication campaigns and media-enabled entertainment-education approaches.

This gap is most far-reaching for resource-dependent indigenous and traditional communities, which typifies the frontiers of climate impact and vulnerability. Critical aspects of life, including subsistence on rainfed agriculture and existence due to proximity to domains of heightened vulnerability (coasts, riversides, forests and hillsides), are manifestly undermined by current and projected climate change related impacts. Disproportionate impacts compound a litany of historical and contemporary exploitation and disadvantages in these contexts, including slavery, colonialism, unjust wars, trade and immigration regimes (Figuerora, 2011; Gardiner, 2011). These compounded disadvantages and their rootedness in systems of exploitation interpolates issues of justice and ethics beyond a techno-scientifically articulated crisis that is

likely to structure climate change perception and disposition distinctly.

Given the urgent existential implications of inaction or even inadequate action, I offer a comparative and cross-cultural study explicitly focused on the global margins. My study seeks to optimize climate change communication in accordance with transformative and reparatory consciousness. The study links the discrete field with critical perspectives in Communication for Development and Social Change and integrates the reparatory notion of climate justice to explicitly highlight the ethico-political terrain on which communicative actions must be directed to be commensurate with the distinct variability, high degree of permanence and multidimensionality of challenges. As detailed in the theoretical outline, this frame enables critical examination of the nature of climate change response mechanisms, particularly adaptation, which underscores that there are impacts that fundamentally and differentially affects human development. Managing these impacts, and the communication processes they necessitate, unfold at differential levels ranging from coping, to adapting, and ideally, pursuing transformations.

While climate impact in indigenous contexts is of primary concern, the study is chiefly motivated by the heightened vulnerability and risk of populations with 'worlds' and histories marked by deep connectedness and dependence upon the natural environment. This non-essentialist motive accounts for the focus on both indigenous and traditional contexts. Vulnerability is conceptually important as it foregrounds "characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a hazard" (Wisner, Blaikie, Cannon & Davis, 2004p. 11). Low or no adaptive capacity and exposure to hazards mean factors such as geography, identity and development markers aid in demarcating vulnerable groups and populations of heightened risk.

In a bid to articulate more robust and efficacious climate change communication mechanisms, this qualitative study probes climate change perception, disposition and actions across 17 indigenous and traditional villages that typifies heightened and disproportionate levels of vulnerability. The villages are drawn from across three Fijian Islands, Andhra Pradesh in Southern India, and the Central American country of Belize. The study employs a distinctly socio-cultural elicitation and analytical framework to delineate and probe climate change perception, disposition and actions that span 14 dimensions (see Table 1 – Integrated Thematic Logic Order, Case Structure). This includes keen attention to contextually variable group membership, alongside standard demographic variables such as gender, age and ethnicity, where applicable. Probing these interpretive communities uniquely illuminates how discrete group membership structures climate disposition. It also highlights contextual intervention levels for knowledge improvement and mobilization generally and across specific dimensions, such as religious and nature-oriented fatalism, discrete motives and potential sources of leadership. Thus, my socio-cultural approach to assessing climate change perceptions and dispositions is primed for attenuating critical gaps in climate risk communication about the needs of marginalized communities not afforded by highly discursive and conceptual psychometric approaches, namely, Kempton (1991) and Lofstedt (1991), commonly used to examine dimensions of climate change and individual perceptions.

My qualitative multi-country study is predicated on seven months of field work under primarily immersive conditions, and an overall sample population of 300 (Belize 74, India 121, and Fiji 105). The sample is drawn from 19 percent of the adult population, and 47 percent of households in the combined field sites. The study is also enriched by textual analysis of project documents associated with seven climate change adaptation initiatives (Belize (two), India (two),

and Fiji (three)) underway in my study sites, extensive participant observation, and several site visits to project installations. The sample composition, which is marked by high macro-group variation and representativeness in terms of gender (47 percent women) and age (40 percent youth – between 18 and 30 years old), was derived via non-random purposive selection and assemblage in 55 semi-structured focus groups, and 22 semi-structured individual interviews.

Mindful of the paucity of cross-cultural testing of widely accepted notions in the extant literature, my case selections were systematically identified to reflect the economic, social, cultural, climatic and geographic diversity of climate vulnerability and risk affecting resource-dependent communities globally. This collective case approach, which includes coastal, farming and forest communities, enables me to interrogate how dominant and external climate change communication modalities interact with traditional retentions in key livelihoods sectors that are directly impacted by both traditional practices and climate change. Crucially, the collective case approach facilitates triangulation, which enables me to outline a set of globally relevant recommendations about how best to optimize communication processes in resource-dependent communities in the Global South across economic, geographic and climatic realities. Accordingly, the study considers the findings of the socio-cultural elicitation process against climate change communication's general acceptance of core communication principles regarding risk perception, message construction, resonance, motive, intervention levels and engagement frames. This process reinforces the shift from atomistic techno-scientific and instrumentalist approaches to climate change communication and clarifies the utility of the socio-cultural in boosting capabilities amidst unprecedented geological change.

This contextual and culture-centric critical examination enables the optimization of global climate change communication across varied pathways: coping, adapting, and pursuing

transformations. My interest in augmenting communicative approaches to climate change, which has social, economic, natural and political implications, is fueled by my observations as a climate change communications and policy actor in Latin American and the Caribbean. For nearly a decade, I have observed the profound, highly perceptible differentiating impacts, and the limitation of interventions in highly vulnerable coastal, agricultural and fishing communities due to a paucity of research on communication modes, messages and tools consonant with the situational and holistic purviews in these contexts. This is also a profoundly personal pursuit rooted in my maternal family's intimate connection and dependence on the natural environment. Consistent with this study, our connectedness manifests in terms of subsistence agriculture, at least three generations of jippi-jappa weaving—a resource-based cottage craft primarily involving hat making—and proximity to domains of risk, including a backyard spring and a substantial contiguous river that regularly maroons us with moderate rainfall. For nearly three decades, we have agonized over crop failure, basic accessibility, property erosion and other impacts.

My study is outlined in nine chapters, including this introduction, literature review, theoretical perspective, methodology, four complementary case studies and a conclusion. The four case studies constitute the study's core. They include a two-tier critical comparative analysis of global climate change communication processes. The first is a macro-level comparative analysis of the 1.5˚C to Stay Alive campaign in relation to the landmark Paris Agreement (2015) on Climate Change. The campaign is significant for potently articulating urgent existential and climate justice needs of the global margins. Accordingly, the chapter examines the basis on which the campaign is deemed a success and distills strategic communicative and engagement lessons for future global campaign's focused on discrete aspects of climate action, including

compensation for past and ongoing impacts (loss and damage).The three complementary micro-cases systematically examine country level data in subsets of villages derived from their relationship with the seven distinct climate change interventions varyingly identified in each country (three in Fiji, two each in India, and Belize). These country cases are commonly formatted in accordance with an integrated typology that combines the two elements (transcript and project codes) of the thematic logic order (see Table 1), a non-random procedure devised to analyze project and interview data and identify the decision-making processes that underpin climate action and inaction at the village level. However, the analytical units' gender and traditional practices, alongside other macro-group dynamics such as youth and age, are progressively integrated because of their high and comparatively more significant resonance in the dataset for this country case. As outlined under paradigmatic considerations in the methodology chapter, this typology is consistent with Gladwin's (1980) study of non-adoption of agronomic recommendations.

Table 1: The integration of the thematic logic order to inform case structure

	Thematic Logic Order for Non-Random Data Analysis	**Integrated Thematic Logic Order**
	Transcripts	**Case Structure**
	Climate Action	Project (Type and) Framework
	Knowledge	Project Activities
	Climate Knowledge Acquisition	Project Action and Causes Profiled
1.	Signs/Indicators	Belief Progression
	Cause and Proximity	Project Outcomes
2.	Climate Risk	Project Perception
3.	Climate Agency	Personal Inclusion and Influence
4.	Motive for Action	Knowledge
5.	Climate Leadership	Climate Knowledge Acquisition
6.	Project Perception	Signs/Indicators
7.	Personal Inclusion/Influence	Climate Action
8.	Belief Progression	Cause and Proximity

9.	Angst	Climate Risk
10	Traditional Practices	Climate Agency
11	Gender	Motive for Action
12	Schooling	Climate Leadership
13	**Project Documents**	Angst
	Project Framework	
	Project Activities	**Cross-Cutting**
	Project Action and Causes Profiled	Gender
	Project Outcomes	Traditional Practices

This study is of significant theoretical and practical value as it directly tackles a dearth of knowledge on how to communicate amidst multifaceted sustainability challenges induced by climate change and variability. My cross-country, cross-cultural, multi-case research endeavour yields insights into audience-specific messaging and framing; the impact of framing for active engagement, the importance of different messengers for different audiences; appropriateness of adaptation plans; efficacy of communication strategies based on traditional and endogenously crafted systems designed to accelerate learning and knowledge exchange; contextual influences on communication; effectiveness of different communication efforts; motives; levels of agency, risk disposition and sources of leadership. These insights will improve collective understanding of key elements of the communication process relevant for communicating and systemically enhancing adaptive capacity, a challenge marked by features that pose profound new challenges for thinkers in environmental communication and communication for social change. Emblematically, how to communicate problems and enable change around intractable issues marked by a degree of permanence and multidimensionality.

Chapter Two: Literature Review

Climate Change Communication has been a challenge since anthropogenic climate change first emerged on the public agenda in the mid-to-late 1980s (Flotum & Gjerstad, 2017; Moser, 2010). The nature of the First Assessment Report (AR1) of the United Nations (UN) Intergovernmental Panel on Climate Change (IPCC), published in 1990, is emblematic of this challenge and why it persists amidst recent concerted effort to tackle the challenge of how to communicate a largely human induced challenge of geologic proportions (Budescu, Bromwell, & Por, 2009; Cohen, Demeritt, Robinson, & Rothman, 1998; Swart, Robinson, & Cohen, 2003). As with the dominant discourses around global environmental change, this authoritative report —now in its sixth iteration— is noted for its reductionism, instrumental rationality and alliance to both moral-liberal and rational technocratic politics (Adger, Paavola, & Huq, 2006; Agyeman, Doppelt, Lyn, & Hatic, 2007; Cohen et al., 1998). As Cohen et al. (1998), Swart et al. (2003) and Pelling (2011) observe, the reductionism is a legacy of the phenomenon being primarily considered a scientific domain and then catapulted into the public consciousness. This holds true whether one harkens back to the 19th century efforts of Aarhenius or more recent concerted scientific expositions about the greenhouse gas effect in the mid-to-late nineteenth century as a way of periodizing this development (Cohen et al., 1998).

In establishing both the climate change discourse and actions upon a techno-scientific rationality, it "bypass[es] the complex, locally specific problems of sustainable development, reducing them to the single imperative of controlling global greenhouse gas emissions [GhG]" (Cohen et al., 1998, p. 348). This reductionism and instrumentality are in part responsible for the limited way the adaptation response frame has been belatedly incorporated within the discourse

alongside mitigation (Agyeman et al., 2007; Figueroa, 2011; Gardiner, 2011; Moser, 2017; Pelling, 2011).

The literature suggests the twin elements of instrumentality and reductionism that imbue mainstream climate change science and policy discourses enable a moral-liberal formulation of the response mechanisms. These mechanisms seek to muster public resolve and sway those with knowledge deficits by communicating ostensibly objective climate risks and impacts, "while the rational-technocratic relies on science to identify optimal policy to which individuals must then submit" (Cohen et al., 1998, p. 349). This privileging of science in structuring policy responses and public understanding of global environmental change accords a limited transmission function to communication in which "the scientific facts are assumed to speak for themselves with their relevance and policy significance interpreted by all audiences in similar ways" (Nisbet, 2009, p. 14). More broadly, according science the role of providing "certain knowledge" for the formulation of political decisions undermines democratic consensus in accordance with conventional liberal political theory and policy optimization (Benkler, 2006; Castells, 2015; Cohen et al., 1998; Dutta, 2011; Moser, 2010; Papa, Singhal, & Papa, 2006; Pelling, 2011).

So, there is broad consensus that the critical role accorded to a rationality that is imbued with imprecision and uncertainty is at once a distinguishing factor for this global challenge and a central reason for the persistent challenges in crafting effective climate change communication mechanisms (Flotum & Gjerstad, 2017; Kiwanuka-Tondo & Pettiway, 2016; Maibach, Roser-Renouf & Leiserowitz, 2008; Moser, 2010; Nisbet, 2009; Pelling, 2011; Spence & Pidegon, 2010). While humans have coevolved with a variable and changing climate since the onset of time, the sheer complexity and pace of the threat of human-induced climate change, as well as the need for and scale of adaptation that its adverse impacts warrants, is unprecedented

(Diamond, 2005, Cited in Pelling, 2011; Galloway McLean, 2010; Leichenko & O'Brien, 2002; Paavola, 2006; Steffen, 2011). It amounts to a "fundamental change in the life support system for humans… and cuts to the core of contemporary society—energy systems, lifestyles, institutions and governance, forms of economic organization and basic values" (Steffen, 2011, p. 23). Accordingly, Garnaut (2008), who terms it a 'truly diabolical policy' challenge, observes that "no other problem—environmental or otherwise—facing society requires such a strong interdisciplinary knowledge base to tackle" (p. xviii).

The social sciences, specifically communication studies and related fields, have much to contribute to this interdisciplinary project, especially given contemporary environmental change's intimate formation within and influence upon the sociological milieu and communication's co-constitutive function in society (Bailey, Cammaerts, & Carpentier, 2008; Couldry, 2003). However, climate change communication scholarship has evolved as a discrete enterprise removed from the established body of work constituting communication studies and as a corollary laggard to the public policy debate on climate change, largely due to the enduring elements underpinning the framing of the issue. While its inclusion in Article 6a of the United Nations Framework Convention on Climate Change (UNFCCC, 1994) suggests early recognition of its importance, it was leveraged in a manner consonant with the instrumentality and rationalism embedded in prevailing understanding of the challenge and therefore served to advance moral-rationalism by building support for and promoting action on climate as defined by specified scientific conclusions around lowering GhG emissions. As Moser (2010) observes, early efforts were "relatively narrowly focused on scientific findings and [IPCC] synthesis reports, sometimes occasioned by particularly severe extreme events, sometimes by high level conferences or policy meetings" (p. 32). This is consistent with a historical tendency among

experts in the natural sciences, particularly health and environmental sciences, to assume that when behaviour diverts from what they deem to be in society's best interest, it is due to "either a lack of relevant knowledge on [the public's] part (an information deficit) and/or misguided attitudes" (Maibach, Roser-Renouf, & Leiserowitz, 2008, p. 489). Invariably, the prescription tends to be to change people's behaviour by making the knowledge they lack available to them and/or persuade them to change their attitudes. While these responses have been variably employed since the issue entered the public policy realm in the late 1980s, climate change communication research only emerged in the mid-1990s, largely with an emphasis on mitigation because of its congruence with techno-scientific imperatives (Cohen et al., 1998; Swart et al., 2003; Pelling, 2011). Adaptation, which is more closely tied to the quotidian or complex lived domains, became an object of study for climate change communication scholars about a decade later and achieved a measure of vibrancy around 2010 (Moser, 2017).

Despite being a corollary laggard to the science and policy debates, climate change communication research now seeks to open the nature of the public discourse through a myriad of discrete analytical pathways: framing, targeting, audience, messaging and channel analysis and employing a wider range of messengers. This is consonant with changes in the science and policy discourses since the IPCC's AR3, which recognized the linkage between climate change and broader socio-cultural issues (Figueroa, 2011; Pelling, 2011; Steffen, 2011; Swart et al., 2003).

Despite this improvement, empirical evidence suggests an urgent need for reflexive praxis, particularly as practice outpaces theory and the scope of theoretical focus is deemed narrow given the multidimensionality and scale of the challenge. So critical is this that Moser (2010) charges the field with being a practice "without a solid foundation of research" (p. 43),

the expansion of which is now widely deemed necessary for increasing public engagement. Moser (2010) and Corner, Markowitz and Pidgeon (2014) note that much of what is known about climate change communication is inferred from other fields. This is inevitable, given the development of a large body of literature over the last generation spanning economics, anthropology, sociology, philosophy and psychology that "has sought to understand and explain the relationship between people's values and how they engage with the natural environment" (Corner et al., 2014, p. 412) and invariably, orienting communication efforts to restructure or attenuate those values.

It is no surprise then that the key categories of climate change communication research all seek to optimize messaging by varyingly focusing on more textured appreciation of some combination of the facets of engagement (cognitive, psychological and social barriers or factors) noted by Lorenzoni, Nicholson-Cole and Whitmarsh (2007). This is evident in both the Yale Program on Climate Change Communication (YPCCC) and Moser's categorization of the field. The YPCCC (http://climatecommunication.yale.edu/topic/) outlines six research categories (audience, behaviours and actions, beliefs and attitudes, climate impacts, messaging and policy and politics), whereas Moser (2010) offers a more succinct tripartite description of the studies in the emerging field that appropriately combines inextricably linked works: those concerned with boosting the effectiveness of an instrumental conception, those concerned with communicating the impacts and adaptation in particular and those engaged in tactical projects. With Moser's (2010) more resonant and compact typology in view, those frontally concerned with the instrumental objective often invoke an information deficit rationale for their project. She also points to key exponents such as Blennow, Persson, Tome and Hanewinkel (2012), Houston, Spialek, Cox, Greenwood and First (2015), Raymond and Robinson (2013), Reser and Swim

(2011) and Tamoczi (2011). As noted at the outset, this approach, although articulated in relatively more sophisticated terms to date, is the traditional response and conforms with the core elements of the dominant techno-scientific and policy discourses on climate change: reductionism, instrumental rationality and an alliance to both moral-liberal and rational technocratic politics. Accordingly, they deem improved communication as a means of attenuating barriers to participation in adaptive actions for various populations. Consistent with its status as a corollary laggard, others are increasingly concerned with communicating "win-win" scenarios that link both mitigation and adaptation communication, long after both response approaches achieved a more balanced standing in the dominant discourses since AR3 (Cohen, et al., 1998; Swart et al., 2003). Yan and Ho (2017) typify these strands of the instrumentalist approach. In their investigation of public knowledge acquisition of climate change, they revisit and call into question the long-established knowledge gap hypothesis and posit that a profusion of more mass mediated information is needed to address what they deem to be the key barrier toward mitigation and adaptation to climate change: the knowledge gap among different socio-economic population segments in Singapore.

More sophisticated approaches that largely supplant the information deficit view of population behaviour in favour of the ecologic view or "people and places" framework (the socio-ecological Obregon, 2014), which is widely used to describe population behaviour (determined by factors linked to both people and place) as determinants of population outcomes, still conceives of communication in an instrumentalist frame. Maibach et. al. (2008), for instance, explicitly interpolate communication and social marketing as policy instruments through which to alter behaviour that may have a significant impact on the environment with the singular objective of limiting the threat posed by climate change to human health. So, the more

nuanced ecological view invoked is directed toward optimizing an instrumental function, as the objective is to identify the people and place-based drivers of population behaviour that can be influenced through communication modalities or trans-theoretical social marketing techniques that are widely associated with piecemeal change in the health and lifestyle domains (Corner & Randall, 2011; Peattie & Peattie, 2009). This is enabled by the framework's emphasis on and ability to make legible the intricate relationship between "human agency in causing or preventing […] environmental problems" (Maibach et al., 2008, p. 490) and how environmental problems in turn directly influence populations and environmental outcomes. The extant literature suggests that even within this narrow focus there is still need for further examination of the potential of this instrumentalist approach: influencing drivers of climate change-related behaviour using communication and social marketing. Studies of this nature have largely focused on individual level drivers of population behaviour, particularly around mitigation—namely reducing household energy consumption, managing transportation choices and green commercial practices (Maibach et al., 2008[1]; Moser 2017; Pelling, 2011). Individual level adaptation tends to revolve around "increasing household preparedness against natural disasters" (Maibach et al., 2008 p. 490). As the ecological model of behaviour implies, population behaviour is determined multifactorially and so much of the literature suggests multi-level interventions hold greater promise for the ends to which the instrumentalists seek to prime communication modalities to achieve in the climate change realm (McKenzie-Mohr, 2000; McKenzie-Mohr, Lee, Schultz, & Kotler, 2012; Obregon, 2014).

However, perspectives within this body of work are multilayered. Stern (2002, cited in Maibach et al., 2008) contends that communication as a policy instrument is limited. He notes its

[1] Majority of 38 studies examined.

importance for influencing some important drivers of behaviour, namely "personal capabilities, habits and routines, values, attitudes, beliefs and personal norms and the social context in which behaviours are or are not performed" (p. 493) but questions its capacity to influence more important drivers of behaviours, including laws and resource deficits (money, access to technology etc). Maibach et al. (2008), McKenzie-Mohr (2000) and McKenzie-Mohr et al. (2012) counter that optimizing instrumentalism through well-honed and directed communication and marketing techniques can effect consequential change(s) across all drivers of behaviours.

While not decidedly instrumentalist in orientation, the other categories of research in climate change communication are not entirely divorced from the objectives of their colleagues who maintain a commitment to the traditional or outmoded conception of a fundamentally co-constitutive modality. Those concerned with communicating impacts and adaptation in particular, seek to address cognitive, psychological and social barriers to public understanding and action on climate change that persists amidst widespread public recognition of the issue. Overall, they are centrally concerned with what various audiences know about climate change impacts and adaptation options: identifying resonant language, capturing impact perceptions, and cognitive and affective responses. In practice, they argue for more effective climate change communication approaches "that allow individuals to engage meaningfully with climate change and opening new prospects for lifestyle decarbonisation" (O'Neil & Hulme, 2008, p. 1). In other words, cultural usability is of central interest and as will be explored in subsequent sections, understanding the "series of complex and constantly evolving cultural discourses" has been acknowledged as most critical for climate change communication (Hulme, 2007, para. 7).

The privileging of affective and contextually resonant interpretive frames alongside cognition has led to innovative projects geared toward understanding and harnessing human

values and cultural worldviews to shape public engagement with climate change. The contention is that effectiveness of climate change communication is predicated upon the extent to which it is made congruent with the values of a target audience (Corner et al., 2014; Dessai, Adger, Hulme, Turnpenny, Kohler, & Warren, 2004; Flotum & Gjerstad, 2017; Miller, 2000; O'Neil & Hulme, 2009; Pelling, 2011; Priest, 2016). This includes work on "the ideological determinants of climate change risk perceptions, the social factors affecting the performance of low-carbon behaviours and the many situational influences on beliefs about climate change and how to mitigate it" (Corner et al., 2014, p. 411). Others concerned with this question focus on enabling greater deliberation by combining natural and social science knowledges in conjunction with an appreciation for non-expert values and experiences to promote engagement with climate change (O'Neil & Hulme, 2009).

While there is "no systematic review of how human values structure public engagement with climate change" (Corner et al., 2014, p. 411), there is a body of work that offers strong evidence in favour of the "interpretative effects of values on climate engagement" (Corner et al., 2014, p. 415), which adds credibility and importance to this category of climate change communication research. Both Dietz, Dan and Schwom (2007) and Nilsson, von Borgstede and Biel (2004)—who first explicitly examined the relationship between values and beliefs about climate change—found a positive relationship between transcendent values and the acceptance of policy measures. Subsequent studies have confirmed this, noting that people with self-transcendent values show lower levels of climate skepticism and are more likely to be concerned about the consequences (Corner et al., 2014; Kearns, 2011). Corner et al. (2004) point to more textured and small-scale qualitative studies that found "individuals who made notable behavioural adjustments to their lifestyles in response to climate change" (p. 414) were more

motivated by altruism rather than biospheric or transcendental values. In other words, the environment per quo (perceived social injustice accompanying climate change) was dominant over concern for the environment per se. Even Dietz et al. (2007), who found a weaker link between the endorsement of certain traditional values and willingness to support climate change policies, notes its significance. While the link is still ambiguous, because other studies connect traditional values with climate skepticism (including varied forms of religious conservativism, per Jamieson (2011)), more careful examination of climate change engagement across societal groups defined by political ideology or cultural worldviews indicate differences that reinforce the resonance of values (Kearns, 2011). Therefore, there is consensus that individuals with stronger egalitarian and communitarian worldviews perceive climate change as riskier than those with individualistic and hierarchical values.

This trend is reflected in Bellamy and Hulme's (2011) multimodal methodological study that sought to understand perspectives of abrupt climate change and their implications in order to yield findings that are crucial for message formulation. This multimodal study's sophistication differentiates it and merits a closer review to illustrate the methodological operationalization of the cultural and values prioritization approach. It includes a three-part internet-based quantitative questionnaire and two focus group sessions with a systematically self-selected sample of respondents to the questionnaire. The questionnaire had three sections: a psychometric instrument tailored to elicit "ways of life" within a cultural theory grid-group typology adapted by the scholars, questions designed to elicit perceptions of "abrupt climate change"—another term for tipping points—and demographic profiling questions. The carefully adapted cultural theory grid-group typology used by the scholars is indicative of the cultural theory interpretive framework used in this study, which is consonant with the prioritisation of values and cultural

worldviews. The scholars reach the peak of their reflexivity with the keen attention paid to ensuring congruence between their methodological decisions and their theoretical frame. They conscientiously bridged the empirical testing championed by the two interpretive schools within cultural theory (stability and mobility) to ascertain the degree to which values and judgment affect the utility of tipping points in climate change communication. This is demonstrated by the use of the quantitative psychometric questionnaires for eliciting "people's ways of life in organizing their social experiences" (Bellamy & Hulme, 2011, p. 5), which is favoured by cultural theorists who champion stability and qualitative focus groups. Mobility theorists would welcome this decision as it functions as a bulwark against self-reporting and captures relevant dimensions of varied social relations. The employment of both in linked fashion—focus group participants were systematically drawn from respondents to the questionnaire and the questions were similarly structured—allows for the testing of the stability of values and enrich our ability to glean actionable findings from the study.

Though the interpretive framework is a reflexive articulation of cultural theory and the methodology is both dialogic and dialectical, ontologically, the scholars approached this study as post-positivists. The laws governing behaviour with respect to concepts such as tipping points in climate change communication have been primarily subjected to quantitative discovery and highly statistical articulations. I, however, demur the urge to label Bellamy and Hulme (2011) positivists because of their interpretive framework and probabilistic presentation of findings. Their near complete avoidance of prescriptive statements and call for further investigation of fatalism in discourses surrounding abrupt climate change is indicative of their credentials as critical realists rather than naive realists. It is a significant shift toward orienting adaptation and associated communication toward situated worldviews.

Linguistic Approaches

The findings from those studies interested in the role of human values and cultural worldviews in public engagement on climate change are compatible with contributions from a linguistic perspective, which invariably guides the outcomes (more granular or nuances understandings of public perceptions and engagement with climate change) sought within this category of climate change research. This intricate connection between the linguistic contributions, specifically narrative analysis and framing, underscores the important role of language use in climate change communications of varied genres. As both a concept and area of research, language use and the broader notion of framing in the context of climate change communication has been an object of study in the social sciences since the issue emerged, but more linguistically oriented approaches only emerged in the 1990s (Flotum & Gjerstad, 2017). It is widely accepted as an unavoidable feature of the communication process. Exemplifying this view, Nisbet (2009) contends 'there is no such thing as unframed information.' He notes "the stories used to communicate climate change knowledge shape opinions and preferences and analyzing such narratives can help explain how they are constructed and how they influence us on personal and societal scales" (p. 15). Also, given the dynamic nature of the sociological milieu, the role of how values restructure framed information and recirculate them makes examining how communities/societies arrive at and respond to stable frames an especially difficult exercise.

Miller (2000) presents four models for understanding the effects of conflicting frames or narratives on public opinion and attitudes toward climate change (framing as storytelling, modeling, canonization and normalization) that also reflects the heuristic device's wide-ranging utility for a constellation of actors: audiences for making sense of and discussing issues,

journalists in crafting resonant reports, policymakers in decision-making and experts to simplify technical details and make them persuasive (Nisbet, 2009). Citing the distinct cognitive challenges associated with global environmental change, the multiplicity of associated frames and the importance of opinion intensity as a central driver of participation on policy issues, Nisbet (2009) argues framing is even more important for climate change communication. The latter is reinforced by Pelling's (2011) comprehensive analysis of the social dimensions to climate change adaptation that makes manifestly clear an array of complex policy options. It is also a prescient observation given the fact that "prioritization and opinion intensity on other issues eclipse general concern about climate change" across publics (Nisbet, 2009, p. 14). Framing is therefore resonant with an emerging body of work in the field focused on adapting information for end-users in specific cultural contexts, including the use of core concepts such as metaphors, iconography and exemplary figures for tapping/building trust in localizing information (de Castro Salgado, de Souza, & Leitao, 2011; Getto & St. Amant, 2014). Hulme (2015) makes profoundly clear the importance of tailoring frames across a multiplicity of contexts to ensure the resonance of linguistic representation and interpretive acts. He invokes Shanahan's (2007) itemization of a multiplicity of frames, none of which emerge from the global margins, that illustrates this well: national security, polar bear frame, money frame, catastrophe frame and the justice and equity frame. This reveals that the utility of the narrative perspective is in helping to "identify actors, realized as narrative characters (hero, victim, villain) and explain the presence or absence of typical components in a story" (Flotum & Gjerstad, 2017, p. 2), which can then improve the crafting of communication efforts, which means they can be used for various ends. But, framing as a communication necessity is primarily used to "pare down information, giving greater weight to certain considerations" (Nisbet, 2009, p. 16). This is

evidenced by Moser's (2010) description of frames as "triggered by words, imagery, symbols" (p. 39) and as detailed earlier, O'Neil and Hulme's (2009) exploration of iconographic framing embedded in non-expert conceptualizations and values to boost engagement.

However, the field is also driven by more exculpatory and transdisciplinary analysis that started to emerge around the mid-2000s, focused on the lack of fixity in scientific articulations and the uncertain nature of the findings outlined in the IPCC Reports (Budescu et al., 2009). This growing activity in linguistically influenced approaches to climate change communication in recent time is largely in response to the dominance of tipping points in the climate change discourse (Russill & Nyssa, 2009), as evidenced by news reports (Boykoff, 2007), science and policy articulations around key international climate change fora (Oreskes, 2004) and global campaigns such as 1.5°C To Stay Alive (CCCCC, 2012). However, the value of tipping points in communication is highly contested as it confounds common-sense notions of change as linear and largely predictable. It is believed that this fundamental divergence between epidemiological change and common-sense notions of social, ecological, political and economic change is both conceptually and procedurally problematic for the promotion of self-efficacy because it stymies problem formulations. The literature suggests there are considerable limitations of crafting messaging around a concept of change that challenges common-sense understanding, which negates the utility of tipping point as a useful heuristic device for understanding and enabling self-efficacy. However, problem formulation is a prescient challenge irrespective of the conception of change or theoretical frame used to guide climate change communication efforts, particularly in empowering and emancipatory notions of communication for social change.

Budescu et al. (2009) examines the utility of tipping points from a post-positivist ontological perspective. They elementally and directly address the core concern that the veracity

of problem formulation is the primary challenge to the utility of tipping points in the promotion of self-efficacy in the climate change sphere. The scholars sought to ascertain how uncertainty is communicated in the most important scientific and policy dossier, the UN IPCC Annual ARs. They posit that the clarity with which uncertainty is communicated determines the potency of tipping points in climate change communication. The scholars used a randomized self-selection procedure to derive a sample of volunteers from their university community, 60 percent of which were students. The scholars' preference for ease in their sample selection rather than a systematic selection, limits its representative nature in terms of education level which significantly impact perceptions of climate science.

Nonetheless, they crafted a credible quantitative methodology that included an individually administered computerized experiment. The questionnaire was designed to capture "beliefs about and attitudes toward the environment and climate change" (Budescu et al., 2009, p. 2) using two established rubrics in the field: New Ecological Paradigm (revised) and Heath and Gifford's perception scales. In the experiment, subjects were assigned to one of four conditions (1) control group - no instructions, 2) a translation group - received the IPCC's guidelines, 3) two verbal-numerical groups - shown numerical ranges and their verbal expressions of certainty (likely, very likely, etc.): a) wide group with the IPCC range and b) a narrow group with more precise percentages.

As critical realists, Budescu et al. (2009) set out to demonstrate the efficacy of an alternative reporting format that would augment the potency of the tipping point metaphor rather than perfect or solve the crisis. Their explanatory frame emphasizes prediction and control over factors such as common-sense reception of verbal terms (likely, very likely, unlikely) in relation to or independent of precise numerical ranges that expressed degrees of (un)certainty about

tipping points. This explanatory and predictive interpretive frame also underscores their postpositivist orientation.

However, they also leverage constructivist elements to articulate their position. Though they believe the nature of knowledge can be apprehended by testing a hypothesis, they also leverage constructivist practices by producing reconstructions to reach a consensus. In fact, their knowledge accumulation process is more nuanced (informed) and the set of recommendations more sophisticated than what obtains in the UN-IPCC reports. This is also evident from the utility of the findings and methodology to catalyze action by improving trust and perceptibility, which are key for enabling self-efficacy. The study's revelatory ethical orientation is a consequence of its enhancement of certainty, which improves problem formulation and makes climate change tipping points more potent. In fact, it seems to embody the articulations of Nerlich, Koteyko and Brown (2010), among the early thinkers to consider linguistic approaches to climate change communications. They charged that "investigations of climate change communications cannot avoid attending to the role of language" (p. 8) by focusing squarely on the linguistic deficits at the core of the dominant discourse.

Budescu et al.'s (2009) study also has resonance with the third category of climate change communication research: studies concerned with tactical questions around improving strategies for producing and disseminating effective materials for communicating climate predictions and related risks in different contexts. This category of research can be described as communication design, varyingly described by scholars (Frascara, 2006; Spinuzzi, 2012; Swart, 2012), including Kiwanuka-Tondo and Pettiway (2016), as "a transactional and constructive practice of communication focused on developing communication artifacts, examining holistic systems and ecologies and creating novel approaches for resolving problems" (p. 82).

While all categories of climate change communication research ostensibly contribute to this endeavour, this category of work is more frontally concerned with communication design and representing scientific information using a myriad of established and emerging tools, such as graphics, visualizations, interactive games or tools, scenarios, etc. While related research seeks to reveal strategies for producing and disseminating effective materials for communicating climate science (predictions and related risks) to various audiences, Cagle and Tillery (2015) suggest this can also pave the way for an ostensibly technical communicative focus to be advocated. This view is indicative of a shift in the conceptualization of communication design from being singularly focused on translating and transmitting information (Kiwanuka-Tondo & Pettiway, 2016; Moser, 2010), as was the case when climate change entered the public policy agenda, to "strengthening the communicational power of the messages" (Frascara, 2006, p. xii—xiv).

Consistent with the interest in visual representation of scientific information in the literature on science communication, most scholars focused on communicating climate change per se, have investigated and supported the view that "visual aspects of scientific communication are central to understanding how climate change information might be framed, mediated, perceived and designed" (Kiwanuka-Tondo & Pettiway, 2016, p. 74).The literature suggests a need to develop climate communication tools that focus on local or perceptible impacts of climate change to increase proximity (spatially and temporally), which is deemed a cognitive limitation and communicate risks and projected impacts in more resonant ways. Consequently, this category of research is replete with experimentations predicated on the skills of technical communicators to depict information on climate projections, risks and impacts rather than

advocate in the socio-political and structural sense (Dobrin & Morey, 2009; Kain & Covi, 2013; Cagle & Tillery 2015).

Kiwanuka-Tondo and Pettiway's (2016) bid to offer a conceptual framework for localizing climate prediction and risk management information to guide strategic communication planning fits this mould at a practical or strategic level. The authors call upon well-established communication design mechanisms such as SWOT analysis, a framework that isolates strengths weaknesses, opportunities and strengths and a multi-sectoral purview that specifies multiple audiences to critically examine the communication efforts of two international entities engaged in monitoring climate extremes and disaster risk management in the Greater Horn of Africa: the Intergovernmental Authority on Development (IGARD) and the Climate Predictions and Applications Centre (ICPAC). In a bid to enhance what recent scholarship in communication design offers, they note, in accordance with Hayhoe (2012), a need for "strategic approaches suited for complex, organizational settings" (Kiwanuka-Tondo & Pettiway, 2016, p. 74) and cross-cultural audiences. This challenge, they argue, is primarily due to the complexity and detachment of the environment within which climate change artifacts are produced and distributed, which renders strategic climate planning, prediction and risk management more than a matter of a cognition (issue of framing).

They delve into the complex, socio-technical process by which both international organizations produce climate change information and highlight the difficulty in localizing it for a myriad of audiences spanning sectors, decision-making levels and user spheres: agriculture, water resources, disaster management, energy, forestry, urban development, health and fisheries; the media; politicians and policy-makers at the sub-regional level and end-users–farmers, women, youths, traders, fishermen, etc. Eschewing the debate about the need to (Spence &

Pidegon, 2010) or unfeasibility of (Birkman & von Teichman, 2010) localizing climate information at critical levels such as the community, they call for greater interaction across discrete technical groups working in both entities and the broad audiences they serve. In doing so, they privilege the dialogic models advocated by Adger et al., (2006), Carvall, (2008), Dutta (2011), Moser (2010) and Reagan (2007), which further underscores the complementarity of the three streams of work in the field noted, particularly with the tailoring of messages that explicitly concentrates minds in the second category of scholarship reviewed.

While Kiwanuka-Tondo and Pettiway (2016) tackled the tactical representation of climate science in a traditional conceptual and strategic sense, others have examined the issue by testing a myriad of tools to hone and merge their capabilities for representing climate science. Data visualization is a hallmark of this approach. It is considered one of the best ways to understand data, according to the YPCCC (http://climatecommunication.yale.edu/topic/), an interdisciplinary research actor that has amassed a range of new media tools to map climate opinion across the United States. It is considered essential for capturing and depicting the rate of changes and impacts associated with climate change, cogently distilling copious data and achieving resonance with a myriad of audiences (Harvey, 2017). This is typified by the widely tracked blog *The Climate Lab Book* by climate scientist Dr. Ed Hawkins. The blog employs a myriad of Graphical Interface Formats (GIFs) and other data visualization tools to distil research on climate variability and change, including a simple animated visualization that progressively shows global temperature increase over one and a half centuries (http://www.climate-lab-book.ac.uk/).

A range of studies have emerged in this area as the affordances of the new media communication context makes interactivity and creativity more compelling and accessible

(Herring, VanDyke, Cummins, & Melton, 2016; Zhao, 2017; Bishop, Pettit, Sheth, & Sharma, 2013). Consistent with the interest in attenuating the cognitive challenge, specifically the proximal challenge, these thinkers note the opportunity to use technological tools to make inaccessible raw climate data legible for lay audiences, especially when localized. Herring et al. (2016), who offer a reflexive take on this category of research has evaluated the ability of localized data visualization tools, specifically the interactive climatedata.us tool, in influencing climate change attitudes and the degree to which geographic proximity matters. While the findings of their study contradict the widely held assumption in climate change communication research that proximity (temporal or geographic) is a central limiting and differentiating factor in climate change risk perception (Moser, 2010; O'Neil & Hulme, 2009; Spence & Pidgeon, 2010; Weber, 2006), it reinforces the view that data visualization of climate science improves its communicability. They note that the interactivity of the data representation modality resulted in "strong changes in beliefs and attitudes" (Herring et al., 2016, p. 103) among participants directly attributed to their use of the site.

Their nuanced contradiction of the consensus in the extant literature is also instructive of the wider contributions of this technique- and technology-focused body of work that further illustrates a remarkable shift from the earlier translation enterprise. Specifically, they note that the interactive data visualization tool reduced "temporal proximity, which led to stronger attitudes toward and beliefs in climate change" (Herring et al., 2016, p. 102), but not significantly more so for proximal groups compared to distal ones. Rather than discounting the proximity thesis altogether, they posit that data visualization of climate science points to a greater degree of salience of temporal rather than spatial proximity. This is a key contribution to collective understanding of how to communicate climate change as the emerging scholarship has

accepted the proximity thesis as a fundamentally distinguishing challenge that justifies the ongoing pursuit of climate change communication research as a discrete enterprise, divorced from the more established fields of communication studies, communication for development and social change, among others.

This ostensibly tactical and experimental body of work unearths further evidence along these lines. Pursuing the question of climate change uncertainty and the degree to which it further complicates decision-making, Bosetti, Webster, Berger, Budescu, Liu and Tavoni (2017) leverage data visualization as a means to address the largely underexplored area of how to effectively communicate climate science to policymakers, critical players in the global negotiations and policy development agenda. Their study of 217 policymakers who attended the landmark 2015 UN Climate Change Conference in Paris (COP21) concludes that graphical presentation of "individual model estimates in addition to the statistical range was more effective" (Bosetti et al., 2017, p. 185) way to influence the views of climate change policymakers on projections of global temperature increases, a critical focal point around which all climate decisions are made and their robustness assessed. Based on the degree of belief updating observed after exposure to the strategically visualized data, this can be taken as indicative of a data visualization principle that can improve climate change communication for this crucial demographic. But even more central to the broader enterprise it contributes to (climate change communication research), it effectively tackles at a core-level scientific uncertainty, another monumental challenge associated with global environmental change that climate change communication research also notes as distinguishing and justification for a discrete practice (Cooke, 2015; Fischhoff & Davis, 2014; Moser, 2010; O'Neil & Hulme, 2009; Spence & Pidgeon, 2010; Weber, 2006).

Bishop et al. (2013), who also seek to address policy-makers' information deficits to effectively address climate change, supports the data visualization principle in a manner relevant to decision-makers and general audiences with less technical experience than policy-makers who are engaged in the negotiation process. Their study examines the effectiveness of a range of 'abstract and realistic' visualization practices and representations of "facets of climate change (downscaled climate-change projections of localised temperature and rainfall and the likely effects of these on land suitability, pasture growth, the visual landscape and sea-level changes)" through an experiment intended to yield findings that will improve land-use policy-making in response to climate change. Methodologically, these decisions allow for probity of (and confirms) the findings of studies that have found that audiences treat uncertainty from distinct sources differently (Abdellaoui, Baillon, Placido & Wakker, 2011) and communication format is a consequential factor in information use (Budescu et al., 2014; Dieckmann, Peters, & Gregory, 2016; O'Neil & Hulme, 2009). The study, which was concerned with both the visualisation options and the process of evaluation, a practice that is seldom done or superficially practiced in climate change communications (O'Neil & Hulme, 2009; Moser & Dilling, 2007), found that visualization tools enabled an "increase in knowledge of the local climate-change situation and also an equalisation of self-assessed knowledge" (Bishop et al., 2013, p. 230-231) and increased concern even from a 'high base'. It underscores the utility of data visualization for improving climate change cognition and perception for all categories of people. They conclude that "multiple interactive tools and the ability to see scenarios side-by-side within a deeper informational context" (Bishop et al., 2013, p. 213) are most effective. This underscores the utility of this approach and experimental category of climate change communications research

overall in demystifying the case for complexity and uncertainty as challenges distinguishing enough to merit a distinct field of study to improve how climate change is communicated.

Paradigmatic Resilience

The literature shows that after nearly two decades on the public agenda, climate change communications research has moved along with and significantly beyond the science and policy issues (Moser, 2010). This is consistent with the fact that in the post-COP 21 (Paris) era, public awareness is near saturation levels and the issue is more about concerted action and less about the facticity of the problem or phenomena on the policy agenda. However, the evolution of the field has been largely driven by urgent needs noted through praxis and contributions from a range of disciplinary interests that accounts for its theoretical and empirical support. This discrete practice is deemed a field by Moser (2010) and functions as such because it is considered as a concerted response to a fundamentally different challenge in terms of the scale of its current and projected impacts, differentiating levels of vulnerability to such impacts geographically and temporally, rate of onset and perceptibility (Diamond, 2005, Cited in Pelling, 2011; Galloway McLean, 2010; Steffen, 2011). These differentiating factors are believed to produce challenges for the communicability of climate change that are distinct. Though these challenges have commanded much critical attention, it imbues the fledgling field with an instrumental orientation decidedly committed to optimizing a modality per quo even as many note the intimate link between the phenomenon and societal practices.

Overall, there are noteworthy continuities within the extant literature that indicate the persistence of the techno-scientific paradigm that has existential implications, particularly for the most vulnerable. This paradigmatic persistence is most evident in the narrow role envisioned for communication and the ostensibly instrumental ends to which the current focus on textured

approaches (facets of engagement, values, culture, cross and sub-cultural perceptions, accessibility, among others) lend themselves. Specifically, embodying a diffusionist logic, elements of technological determinism and the neoliberal or economistic imperatives that structures many campaigns. This is unsurprising as "the deepest disputes in Western social science about macro-level sociological pursuits that are defined in techno-scientific terms (e.g. developmentalism) tend to be between strands (liberal and radical varieties) of the dominant rather than alternatives (Pieterse, 2001, p. 23). The adaptive capacity of paradigms is a fundamental explanatory factor for the smooth transitions that often blurs the persistence of the dominant as Khun observes (cited in Rogers & Hart, 2003, p. 268).

Ethico-Political Perspective

Twin consequences of this are insufficient explicit recognition of the politics of climate change and climate change communications research's marginalization of communication's expansive and maximal role in holistically tackling a complex phenomenon. This is observed even as Moser (2010) makes overtures to "the common-but-differentiated fate that the interconnected inhabitants of this planet now face" (p.37), while calling on scholars to consider the purpose of communication along the typical horizons articulated in communication studies: 'to inform and educate;' 'achieve some level of engagement and action' and 'bring about changes in social norms and cultural values.' However, these narrow roles envisioned for communication fall far short of positioning it as a constitutive tool suitable for enabling commensurate systemic changes at micro-, meso- and macro-political levels. The invocation of conventional risk communication research as a key disciplinary influence partially accounts for the narrow roles envisaged for communication in the realms of climate change research, policy and action. It is primarily concerned with analyzing factors, "often technical, that influence the

form and effectiveness of communications without including the social contexts within which individuals adapt to risk and information exchanges occur" (Agyeman et al., 2007, p. 130). However, the 'complex and diabolical' phenomenon "cuts to the core of contemporary society-energy systems, lifestyles, institutions and governance, forms of economic organization and basic values" (Garnaut (2008) cited in Steffen, 2011, p. 23). This necessitates complex action aimed at fundamentally reimagining society (social change), an inevitably political matter that requires communication differently oriented and varyingly situated to be commensurate with the challenge(s).

This is a view supported by the climate adaptation and just sustainability development literature concerned with rights and outcomes. The former, which is related to the second category of climate change communication research reviewed, points to the need for an ethico-political awareness because of the lack of uniformity in the distribution of risks across and within societies (Cole & Foster, 2001; Dow, Kasperson, Bohn, 2006; Leichenko & O'Brien, 2006; Pelling, 2011; Rees & Westra, 2003; Steffen, 2011). While adaptation is one of two climate change response mechanisms (the other being mitigation) and is more likely to result in gains (Adger et al., 2008; Cohen et al., 1998; Pelling, 2011), it only gained traction in climate change communication research in the second-half of the 21st century (Adger, Dessai, Goulden, Hulme, Lorenzoni, Nelson, Naess, Wolf, Wreford, 2008; Moser, 2017). Its belated policy and research traction are a result of its costly, complex, and contextually influenced nuture, which warrants the significant degrees of situated engagement noted above. Thus, it has been considered a hindrance to achieving political consensus in global negotiating processes from the onset of the discourse (Glantz, 1990).

Emblematically, adaptation did not gain centrestage in the scientific and policy discourse, the premise for the communicative corollary, until the working conferences leading up to IPCC AR3 (2001). This shift was at the urging of thinkers and negotiators from the global margins, where climate change-induced impacts are or will likely have the greatest impact and compound existing challenges. However, the dominant natural science literature on climate adaptation pays scant attention to the social justice aspects of adaptation. It varyingly explores adaptation options (CCCC, 2010; Smit, Burton, Klein, & Wandel, 2000; Splash, 2007; Stern, 2006) and prudential considerations (Gardiner, 2011) that are mirrored in the related communications research. The absence of the ethico-political consciousness from the embryonic climate change communications research field noted, even within the adaptation stream of scholarship, is unsurprising considering its status as a corollary laggard. It is strikingly replete with wide employment of economic frames to address the reductive mitigative discourse: reducing GhG emissions. Maibach's et al. (2008) review of 38 studies concerning communicating climate change shows that a majority focused on household energy conservation used communication to influence individual level drivers of population behaviour and all relate to reducing GhG emissions.

However, these reductive frames, which are consistent with the "formulation of the relation between science and politics, is a weak foundation for responding effectively to climate change" (Cohen et al., 1998, p. 349). Alongside widely mooted apprehensions and credibility concerns caused by the imprecision of the science, itself a social construction, the nature and quality of public engagement have also been questioned. In other words, employing "the moral-liberal politics of global citizenship and public education to convince individuals to change their lifestyles to avert global climate change has run afoul of public apathy and mistrust," per

Hinchliffe (cited in Cohen et al., 1998, p. 349), as its delayed onset and the top-down/instrumentalist means of engagement "divorces them from their social context" (p. 349). In fact, this may account for the general failure of the persuasion approaches and point to the need for more granular examination to structure climate change communication to optimize action, especially across cultural contexts as much of what is known about communicating climate change is based on western observations.

The fact that adaptation itself poses justice implications on multiple measures (timing, appropriateness, scale and ripple effects) warrants a more textured reading as a socially embedded process. While a great deal is known about communicating climate change mitigation and general lessons may undoubtedly hold across adaptation and mitigation even in varied contexts, communicating adaptation is distinguished by its multiple forms. Specifically, climate adaptation ranges from resilience or coping, to transition and transformation (CCCCC, 2010; Gardiner, 2011; Pelling, 2011). This means that across adaptation forms, there are likely different roles for communication and a need for situated understandings of the likely outcomes across contexts for each form.

Distiling and Tackling Gaps

Accordingly, this dissertation tackles critical gaps surrounding the communicability of climate change adaptation, the second category of climate change communication research reviewed and noted for being the most expansive, socially implicated and promising response mechanism. It decisively explores how to effectively communicate climate change in a manner that enables the individual, socio-political and economic changes commensurate with the nature of the challenge by contemplating efficacious communicative approaches and actions that are dialogically determined in accordance with the multiplicity of adaption pathways, as well as

adaptation's dynamic and differential political and existential implications at various scales. This is distinct from the extant literature's politically agnostic focus on the role of values and insights about risk perception (Corner et al., 2014) that seeks to determine and structure the acceptability of largely pre-determined adaptation options.

This approach is premised on an expansive conception of communication that goes well beyond the starting point Moser (2014) highlights:

> Basic tenets of effective practice, such as knowing one's audience, relating to people in ways that resonate with pre-existing values and beliefs, engaging respectfully and addressing the whole human being, not just assuming that there is an information deficit, but also tapping into deep motivations and understanding resistances and barriers to action—all of these hold as firmly as ever in communicating adaptation. (pp. 49)

As outlined in the subsequent chapter, the study connects the discrete climate change communications research enterprise with the established fields of communication for development and social change with attentiveness to the participatory and empowering frame and modalities that have emerged as corrolaries consanant with the just sustinabilities development discourse. The study mobilizes the environmental justice frame, including notions of climate justice, to explicitly demarcate and critically illustrate the ethico-political terrain(s) on which communicative actions and efforts must be directed to be commensurate with the nature of the challenge in a holistic sense. The study uniqely leverages this critical culture-centric disposition to address three core gaps in the current discrete climate change communication literature that my experience as a climate change communications practitioner and the extant literature suggest are central for robust action. These three challenges are: a paucity of research on communicating climate change adaptation (Maibach et al., 2008; Moser, 2017; Pelling, 2011),

scant attention to non-western and cross-national studies (Boykoff, 2007; Miller, 2000; Moser, 2010; O'Neil & Hulme, 2008) in contexts (much of the Global South) where some of the central issues highlighted as fundamentally distinguishing challenges (scientific uncertainty, proximity to impacts (spatially and temporally) and low opinion intensity and problem prioritization) do not apply and a need for greater integration of theory and praxis.

The study addresses these three gaps by attenuating collective understanding of communicating climate change adaptation at various levels (coping, resilience and transition) in multiple distinct contexts, where the high and immediate perceptibility of climate impacts confounds the factors asserted as distinguishing and foundational for a discrete field. This is achieved by examining data gathered from 17 villages across Belize, India and Fiji where various sorts of adaptation initiatives were and/or are being pursued with varying scope and levels of engagement. This rendering of multiple non-western, case-specific, cross national research projects decidedly focused on ongoing climate adaptation processes, which examines climate change communication in relation to social change, therefore clarifies the foundations for the communication and engagememt efforts commensurate with the challenge described across levels of ambition or degrees of empowerment. These communicative and engagement efforts are distilled in the adaptive pathways highlighted in the conclusion chapter.

The study thus contributes and illustrates that the communicative triggers for adaptation are decisively different from those of mitigation. Its multifactorial embeddedness in lived experiences means the social and cultural worldviews—namely religion and nature, knowledge systems, social structures and order—require greater focus on situated and collectively determined action to awareness models than pre-determined awareness to action.

Next is a description of the critical framework employed to probe and detail communication's affordances and the associated tools that can enable the individual, socio-political and economic changes commensurate with the fundamental destabilization of life underway amidst unprecedented global environmental change.

Chapter Three: Theoretical Perspective

As a discrete enterprise, climate change communications research does not contemplate the role of communication in enabling the scale of changes (individual, socio-political and economic) commensurate with unprecedented anthropogenic climate change. This limitation is chiefly due to the absence of a holistic view of climate change and the ethico-political lens the challenge necessitates. The ethico-political gap, which is a product of the reductive and instrumentalist formulation of climate change science, policy and communication discourse, imposes functional limitations on the scope and efficacy of climate change action. The imposition of functional limitations on climate change communications is highly consequential given the urgent nature of the challenge and the narrow(ing) window of opportunity for effective action.

Therefore, this chapter outlines a multiperspectival reading of the phenomenon and its implications. It formulates the issue more expansively as a complex development challenge that is primed for probity within the just sustainable development paradigm, particularly the participatory communication for development framework because it is crafted for tackling development issues deeply embedded in lived contexts. This critical perspective foregrounds the multidimentionality and variability of climate change impacts and optimal adaptive response mechanisms, alongside the phenomenon's differentiated socio-cultural embeddedness. Such an expansive problem formulation paves the way for the examination of a more comprehensive and multifactorial role for communicative actions in climate change responses and their efficacy for realizing different outcomes. To highlight the varying roles for which efficacious and ethico-politically conscious communicative actions can play in climate change response mechanisms, Mark Pelling's (2011) tripartite adaptation framework, which is within the Just Sustainability

paradigm, is employed to foreground actionable and participatory development approaches. Specifically, it clarifies the need for communicative actions that can enable coping or resilience (stability), transition (incremental social change and the exercising of existing rights) and transformation (new rights claims and changes in political regimes).

A Holistic View: Climate Change and Sustainable Development

It is imperative to situate climate change within the context of development, specifically the Just Sustainability paradigm. This is accentuated by the scale, multidimentionality and peculiarity of the material and immaterial impacts of climate change. Poignantly, climate change has differentiating impacts that are and will continue to compound pre-existing development challenges, namely poverty, vector borne diseases, economic malaise and cultural erasure (Adger et al., 2006; Agyeman et al., 2007; Cole & Foster, 2001; Dow et al., 2006; Leichenko & O'Brien, 2002; Paavola, 2006; Pelling, 2011; Rees & Westra, 2003; Routledge, 2011; Steffen, 2011). Therefore, this study is concerned with achieving an actionable participatory approach towards Just Sustainable development. Just Sustainable development seeks "to ensure a better quality of life for all, now and into the future, in a just and equitable manner, while living within the limits of supporting ecosystems" (Agyeman, Bullard & Evans, 2003, p. 2). This conception is consistent with critical perspectives attuned to disproportional negative impacts or outcomes (Capehart & Milovanovic, 2007), including related notions of environmental racism or "eco-apartheid" (Rees & Westra, 2003, p.100).

This conceptualization of sustainable development makes manifestly clear that climate change poses questions of fairness, particularly justice, which Rawls (1999) deems 'the first virtue of social institutions.' As Gardiner (2011) observes, even those who question the pre-eminence of what is among many facets of ethics deem it a central concern. Given the extant

literature's robust reading of justice, it is this ethical aspect that commands primary attention. The justice implications of climate change made clear by a holistic sustainable development frame is most apparent when considering climate adaptation in particular, which can also have justice implications "because benefits and costs are frequently distributed in ways that consolidate or exacerbate current vulnerabilities rather than reduce them" (Adger et al., 2006, p. 4). In other words, the fairness of even participatory adaptation strategies (*scale: individual or collective; timing: proactive, reactive or inaction; and resources dedicated*) is central in considering the effectiveness and legitimacy of climate actions and the possibilities they generate (Adger et al., 2006; Pelling, 2011).

Climate change communication as a discrete practice seeking to tackle a reductive techno-scientific formulation is a central challenge. As established in the literature review, this is chiefly due to the field's emergence as a corollary laggard to the instrumentalist global science and policy debates on climate change. Newby (cited in Cohen et al., 1998) notes the tendency within the Intergovernmental Panel on Climate Change's (IPCC) first and second assessment reports "to deal with human or social dimensions of global change by attaching some social science analysis, virtually as an appendage, to a body of work that defines the problem in terms of natural science approaches" (p. 341). So, despite the multidimensional and cross-sectoral impact of climate change, the communicative corollary also leverages social science approaches, rarely the humanities, to analyze "the driving forces, impacts and adaptive capabilities relative to the biophysical phenomenon of global change, largely divorced from their social context" (Newby, cited in Cohen et al., 1998, p. 341). This is particularly evident as it relates to the link between climate change and the political economy of development, which the climate justice

narrative emanating from the Just Sustainability paradigm explicitly implicates (Routledge, 2011).

Climate justice is rooted in the Global South, particularly Small Island and low-lying developing states, where climate change impacts and risks are most profound. Climate justice foregrounds capitalism as the root cause of the phenomenon. It implicates the rapacious and rationalist pursuit of extractive activities without regard for social and environmental externalities, chiefly fossil fuel extraction and broader energy intensive economic and social processes. This is of consequence because fossil fuel use is the foremost source of greenshouse gases (such as Carbon Dioxide), and the increasing emission of which is the main cause of anthropogenic climate change. Broad acceptance of the unequally distributed and experienced social and environmental externalities produced by fossil fuel dependent economic "processes and the values of the political economy that increasingly [and historically] concentrate[s] wealth in the hands of a few [people and nations]" stymies political action (Pelling, 2011, p. 11). By implicating the logic of the prevailing economic dominant, the climate justice narrative positions North Atlantic states (North America and Western Europe), who first industrialized with few constraints, as the key beneficiaries. By implicating capitalism "as a social and ecological relation" in human-induced climate change (Routledge, 2011, p. 385), climate justice seeks redress or "corrective justice" (Gardiner, 2011, p. 310) for the divergence in benefits and risks associated with what David Harvey (cited in Routledge, 2011, p. 385) calls "accumulation by dispossession." Climate Justice is enshrined in the Bali Principles of Climate Justice (2002) outlined by the International Climate Justice Network ahead of the Earth Summit and sought to "shift the climate change discourse from a scientific-technical issue to one of human rights and environmental justice" (Agyeman, 2007, p.119). Very much in concert with the charges outlined

against the dominant discourse, climate justice advocates contend that "the scientific debate has stymied productive global warming discussions and hindered more equitable policy solutions" (Agyeman, 2007, p. 121). So, unlike ecological justice that is concerned with justice in relation to nature or injustice between species, climate justice poses a more multiperspectival reading of the impacted and the layers of impacts (Agyeman, 2007, Capeheart & Milovanovic, 2007; Gardiner, 2011; Routledge, 2011). The preamble of the Anchorage Declaration (2009) issued at the Indigenous Peoples' Global Summit on Climate Change illustrates this by calling attention to a litany of historically situated vulnerabilities exacerbated and/or induced by climate change that are "at their core, articulations of struggles to sustain environmental identity and heritage in the face of threats to the physical resources that shape their living ecology and the threats to values, beliefs, behaviours, histories, and languages" (Figuerora, 2011, p. 232). The declaration states:

> We are experiencing profound and disproportionate adverse impacts on our cultures, human and environmental health, human rights, well-being, traditional livelihoods, food systems and food sovereignty, local infrastructure, economic viability and our very survival as Indigenous Peoples. (Anchorage Declaration, 2009, cited in Figuerora, 2011, p. 232).

Climate justice is "wedded to environmental justice in accounts of intergenerational justice, distributive inequities and active contribution to the causes of climate impacts" (Figuerora, 2011, p. 235). Consistent with the bivalent logic of environmental justice that requires both distributive and recognition justice to be bridged by participatory forms of procedural justice, climate justice goes further by placing both environmental identity and

heritage issues at the core of the discourse to offset the inability of distributive frames to account for the intangible and paves the way for the articulations of the impacted or vulnerable to be heard. So, climate justice is distinct in that it makes clear considerations for the full range of losses induced and exacerbated by climate change (tangible and intangible) that cosmopolitan conceptions of justice do not (Attfield 1999; Cole & Foster, 2001, Figuerora, 2011, 2006; Paavola, 2006) and goes beyond environmental and ecological justice by linking to a broader array of socio-political and historical injustices that undermine adaptive capacity by implicating the dominant logic around which life now functions. In particular, climate justice raises questions about "corrective justice" (Gardiner, 2011, p. 310) premised on the articulations of the impacted/vulnerable. This reparatory orientation considers "how to treat past emissions, and some actors making restitution because of their roles in past failures," including failure to meet past goals and propagation of misinformation (Gardiner, 2011, p. 310). This means the intricate link between the social and the environmental and the power dynamics involved in climate change problem formulation, its interpretation and consequent actions/responses across contexts, levels and time periods has fundamental implications for vulnerability (adaptive capacity) and achieving ethical outcomes (justice).

Therefore, the concept of climate justice is critical to my analytical frame. It is especially useful in considering the nature of adaptation decision-making because of the co-causal nature of the social and the environmental and pursuing an ethico-political study with a comprehensive view of the issue. This is underscored by the concept's regard for the interrelatedness of social conditions with the environment and power dynamics with historical (past) sensitivity to the extent that it intersects with universal justice and ethics concerns beyond the looming ecological crises that compound vulnerability and undermine adaptive capacity, namely slavery,

colonialism, unjust wars, trade and immigration regimes, poverty and human rights (Figuerora, 2011; Gardiner, 2011).

The multiperspectival and critical notion of climate justice also makes clear the complexity of acting on climate change, as consensus around it by developing countries does not negate contestations around allocation and impacts and its differential implications at various levels, including within their own borders (Gardiner, 2011; Pelling, 2011; Routledge, 2011). The multiple scales of impact and connections with varied scales of responsibility interpellated by climate justice in the context of the Anthropocene also casts doubt on conventional liberal political theory's "constructing basic justice on the model of a single self-sufficient nation-state" (Gardiner, 2011, p. 319), which harkens back to the failures of the moral liberal politics and credibility challenges underpinning climate change's rational technocratic frame (Cohen et al., 1998). Gardiner (2011) posits that this "mismatch of vulnerability and responsibility," which is exacerbated by power inequalities, questionable regard for intergenerational dependence and insufficient theoretical attention to the ethical considerations, in addition to global political inertia, constitutes "a perfect moral storm" (p. 313). This view brings into question the possibility of avenues for meaningful action.

By shifting from the "isolation model" that conceives climate change as a techno-scientific issue, there remains space to act moderately and/or decisively: the moderate options from a climate justice perspective includes those that result in "mild rectification" (including modest improvements in some areas intersecting with climate change) and the "neutrality model," which concentrates on preventing the expansion of wider injustices (Gardiner, 2011, p. 319; Pelling, 2011). However, this study's commitment to a politics of hope and change grounded in addressing fundamental social injustices disposes it towards the vanguard model or

pathway (Leary, 2006; McIntosh, 2008; Orr, 2011; Stoknes, 2015). Climate change in this mould, particularly the radical and action-oriented readings of hope offered by Lear (2006), McIntosh (2008) and Orr (2011), is an opportunity to fundamentally rethink how we live and in so doing, come to terms with compounded vulnerabilities and injustices both materially and ideationally. This politics of hope with a profound interest in enactment at the lived level such that it is materially resonant runs counter to the prevailing political climate at this juncture. However, history suggests these are not immutable limits. Distilling and enacting participatory processes is central for enabling the radical and action-oriented responses to the material and immaterial impacts of climate change. It is against this backdrop that this study adopts participatory communication theories, alongside Pelling's (2011) tripartite climate adaptation framework that foregrounds actionable response pathways for incremental and/or radically transformation, as its theoretical and conceptual frameworks for the analysis of various scales of adaptative actions across three countries.

Participatory Communication Approaches and Communication for Development and Social Change

Given the primary concern of Just Sustainability discourse's (particularly climate justice) with the lives of people and climate change's explicit interpellation of existentiality and quality of life concerns, this study is guided by George Herbert Mead's comprehensive view of communication. George Herbert Mead views communication as "the basic social interactive flux of human activities in a manner akin to the way money is to economics" (cited in Roy, 1987, p. 109). This conceptualization foregrounds the centrality of communicative processes in probing and tackling modernity's most pressing and multidimensional development challenge.

From this expansive communicative vantage point, the interdisciplinary nature of communication for development and social change uniquely positions it to offer actionable tools to address the multidimensionality of the reformulated challenge, which is deeply connected with lived experiences and existentiality, and realize degrees of climate justice. Specifically, communication for development "tackle[s] critical questions about the way people communicate, express demands and act upon critical social problems. It is usually positioned to understand the increased centrality of voice and rights as guiding principles of social change" (Waisbord, 2014, p. 147). Fraser and Restrepo-Estrada's (1998) description of development communication further underscores the field's natural suitability for probing and acting upon a phenomenon that profoundly implicates livelihoods:

> the use of communication processes, techniques and media to help people towards a full awareness of their situation and their options for change, to resolve conflicts, to work towards consensus, to help people plan actions for change and sustainable development, to help people acquire the knowledge and skills they need to improve their conditions and that of society and to improve the effective-ness of institutions (cited in Ramirez, 2005, p. 425).

The shift from a narrow techno-scientific problem formulation is consistent with the emergence of more nuanced critical or communitarian perspectives in the development discourse's communicative corollary since the 1970s. The evolution of thought and practice sought to overcome the failures and pre-eminence of an economistic and prescriptive meta-narrative (modernization paradigm). Amidst conceptual challenges and changes associated with

the normative and historical contexts of communication and development, a broad spectrum of 'alternative" strategies emerged (Pieterse, 2001). These 'alternative' reflections, which include the Just Sustainabilities paradigm, are at the foundation of "post-structuralist, post-modernist, postcolonial and communitarian theories, [which] together provide an assumptive basis for participatory strategies" (Melkote and Steeves, 2015, p. 372). As articulated by Inayatullah (1967), they emerged amidst a growing understanding of development "as a process through which a society gains increased control over its environment, political identity and individuals gain increased control over themselves" (cited in Sparks, 2007, p. 44).

Although communication occupied a central role in the foundational discourse on development and emerged as its corollary, communication and development are not congruent conceptually (Hemer and Tufte, 2005; Pieterse, 2001; Quebral, 1987). However, both communication and development have an explanatory effect on each other and may each be part of the other (Roy, 1987). This study is guided by the participatory communication paradigm, which eschews the primarily economic and political orientation of the modernization paradigm and dependency theories, noting that there is no universal path to development. Thus, development is conceived of as "an integral, multidimensional and dialectic process that differs from one country to another" and operating at fundamentally different scales (Servaes, 1999b, p. 6).

The participatory communication paradigm is noteworthy for its contestation of the special epistemological privileges that modernization theorists accord to positivism and other western ways of knowing and interpreting the world (Jacobson (1996), cited in Sparks, 2007, p. 61). However, participation is open to a multitude of interpretations and is, as Servaes (1999b) observes, further evidence of the pluri-paradigmatic nature of development communication.

Rather than a grand narrative or single paradigm, this participation approach ranges from "attempts to mobilize the populace to cooperate in development activities to participation-as-an end in itself that aims to empower people so that they may articulate and manage their own development" (Melkote and Steeves, 2015, p. 373). However, the dialogical pedagogy of Paulo Freire (2000) and the ideas of participation and self-management articulated in the New World Information and Communication Order (NWICO)/UNESCO debates and captured by the McBride Commission of the 1970s, embody the principles widely accepted as common sense (Servaes and Malikhao, 2005). Common approaches such as community organizing, action research, participatory action research and social mobilization are conceptually grounded in Freirean philosophy (Cadiz, 2005), which seems prescient given the nature of the contestations that mark the field and the emergence of a consensus around the core issues they tackle: "the centrality of power, the integration of top-down and bottom-up approaches, the need for a communication 'tool-kit' approach, the articulation of interpersonal and mass communication and contextual factors to realize the goals of the field" (Waisbord, 2005, p. 78).

However, the operationalization of the principles espoused by the participation paradigm varies across projects. The operationalization varies in that the negotiated variant in development communication tend to proffer very modest goals and, in some formulations, is consistent with neo-modernist/continuity variant's appreciation for piecemeal changes, but at its most sophisticated, it is distinguished by its focus on traditional settings, structures and communication channels (Servaes and Malikhao, 2005; Sparks, 2007). Conversely, the radical variant (namely, multiplicity and concretization), which motivates this study, begins with a view of reality rather than one of modernity. The latter guides this study because it is much closer to explicit theories of social change in the normative democratic traditions, and conceives of or

accommodates communication systems in the cultural and functional terms, even in cases where media are not explicitly noted (i.e. conscientization). This is most palpable in the dissonance between the UNESCO discourse's neutral conception of the public and institutions, and Freire's explicit focus on the oppressed, individually and collectively. However, a heightened degree of reflexivity precludes adherence to a binary approach that negates leveraging the strategic value of the negotiated variant.

It is therefore possible to identify the continued salience or dominance of modernist principles based on how they are deployed. Whereas the diffusion or modernist model conceives development communication as a mere vertical transfer of mass mediated information to attenuate a lack of knowledge and enable behaviour change through social marketing and edutainment activities, the participatory model seeks to address structural inequities, (re)claim rights, empowerment and equity. As a more process-oriented and community-focused model, participatory approaches ascribe solutionist potential to ongoing interactive knowledge exchange at local levels using interventions consistent with the common approaches noted above (Morris, 2005). However, Morris (2005), who offers a comparative analysis of both the diffusion and participatory models, which have dominated the "strategic application of communication technologies and processes to promote social change" (p. 123), contends that a variety of development efforts employ a combination of strategies that vary according to local needs, resources and politics, which fits the mode of the multiplicity paradigm that takes a lack of replicability to be a virtue. So, it is perhaps more appropriate to speak of how the multiplicity approaches lend themselves to congruence with notions central to the old paradigm. Cornwall's (1998) contention that both Gender and Development and participatory development are compatible with neoliberalism reinforces this observation.

For instance, human development seeks to maximize society's economic potential, albeit from the perspective of the individual. As a case in point, Sen (1999) informs us that improving women's agency is an ideal way to empower them and meet national development objectives. He cites education/literacy, employment outside of the home and property rights as means of empowerment for women (p. 191). His emphasis on the individual, initiative, rationality and capital are undeniably neoliberal and modernist. To illustrate the importance of empowering women, he emphasizes the wide-ranging benefits for society as a whole: lower mortality rates and economic benefits for the elderly and children. This represents a micro version of the dominant 'economistic' development approach. However, this does not negate the fact that Sen's (1999) characterization of Development as Freedom aptly captures the mutually reinforcing relationship between rights and development, but the fundamentally instrumental and economic basis of the argument is consistent with modernist conceptions. It embodies what Cornwall (1998) terms the strategic use of essentialism, which does not fit neatly with complex realities. The instrumentalist economic frame is also evident in the limited conception of the social contract/citizenship (formal democracy), which he takes to account for the absence of famine, an observation de Waal (cited in Vincent, 2004, p.120) has critiqued.

Likewise, microcredit, which a strong contingent of practitioners has championed as a means of empowering women primarily, can be deemed a form of objectification or strategic essentialism to advance capitalist intents. Briggs (2001) asserts that micro-credit should not be interpreted as a radical means of emancipation and empowerment because it works within the existing societal structures (male dominance and female subservience plus 'capitalocentrism'). It represents a move to peddle capitalism to women on the margins of society and yet nullifies key issues of power and voicelessness. Rankin (2001) extended the discussion by positing that micro-

credit as a development strategy fails to circumvent the global economy and as such, falls within the global capitalist structure. However, consistent with the primarily mitigative frame that guides the reductive and instrumentalist formulation of the climate change challenge, micro-credit is increasingly seen as a means of delivering low-cost renewable energy resources, including smokeless stoves and lanterns, in climate interventions. People who would otherwise be outside of the market due to a lack of capital and other resources are brought into its fold, thereby contributing to the ultimate objective of expanding the capitalist system to new frontiers.

These observations are consistent with a broader trend where the pursuit of the key principles (self-reliance and cultural identity, access and participation) which were at the core of the UNESCO discourse that found resonance with adherents of "another development" who championed the importance of traditional values and also championed democratic process and human rights (variants) (Carlsson, 2005), also seem to have embraced a degree of technological determinism and the diffusionist logic in their pursuit of empowerment at the margins and cultural preservation. The preponderance of new visual, web and audio technology, as well as their synchronization in the new information context means connectivity to key platforms is now deemed central for empowerment objectives, for instance, "the rediscovery of indigenous frameworks that have enabled Australian aboriginals to survive into the new millennium rather than learn new skills" (Morris and Meadows, 2003, p. 71) and varyingly articulating land rights, meta emancipation and preserving identity (Rodriques, 2001).

So, while mindful of the continuities observed, the fact that the convergence and dialectics observed have been the product of pragmatics rather than critical reflection imbues this research with a motive to bridge the gap between theory and practice. Short of bridging this gap, it is premature to reject the validity of development and climate action projects by multilateral

agencies, the state and large, primarily international, non-governmental organizations because they embrace resilient and possibly contextually adapted tenets of the founding paradigms (and its problematic heritage). The fact that paradigms are essentially post-hoc constructions intended to order reality (Halloran, 1987) makes this especially prescient. Thus, philosophically, this study eschews binary thinking that pits diffusion of innovations against participatory strategies.

Given the various planes on which development unfolds and the consequential material impacts (current and projected) in the Anthropocene, this study is primarily concerned with distilling the empowering and participatory potential of the two dominant variants of development communication (participatory development communication and development support communication), which are associated with multiple scales (local, regional, national and international). Traditionally, of the two major approaches, participatory development communication is most applicable to a whole society and is often a feature of a national development plan, whereas development support communication is typically project oriented, strategic and diffusionist (Jayaweera, 1987). However, as observed above, operating in a normative and objective field means many of the arguments levelled at the latter are applicable to the former and this is evident throughout the evolution of the field. This view is underscored by contemporary reassessments of strategic diffusionist actions that place communication and collective action at the centre of social change. Such reassessments underscore the heightened import of embedding strategic issues and actions, participation and co-equal communicative actions to achieve social change and empowerment. Waisbord (2014), for instance, contends that the normative desirability and pragmatic imperative of broad-based active engagement in social change to ensure durable changes necessitates deeper understanding of participatory strategic communication because contrary to the view that social change is unpredictable and random, it is

planned with turns and twists. In other words, while this study privileges broad-based, contextually determined participatory processes as a basic human right, it deems the pursuit of such to be insufficient as an end within itself in enabling the level and nature of changes necessitated by the material and immaterial impacts of climate change.

Participatory Processes and the Culture-centric Purview

Consistent with Waisbord's (2014) privileging of concerted action based on insights yielded through strategic participatory communication approaches, this study builds upon Dutta's culture-centred communicative approach to participation, empowerment and social change. Dutta's culture-centric perspective "fundamentally notes the capacity of marginalized communities to consciously and strategically participate in processes of change that are meaningful to them (Dutta, 2011, p. 3)." While the perspectives within subaltern studies primarily problematize and discursively challenge prevailing conditions and externally driven development interventions, Dutta's perspective enables the fashioning of a pragmatic yet critical set of actions. The eschewing of cultural essentialism and a solutionist view of participatory processes enable this shift towards action by highlighting the negotiated status and impact of structures, culture and agency across the subaltern. The critical culture-centric perspective highlights that even where there is broad population-level engagement (participation) in development activities, the outcomes are mediated by socio-cultural and political realities and degrees of agency, which can be constraining and/or enabling. Thus, in addition to illuminating the variability of likely outcomes and impacts from participatory development processes, the critical culture-centric approach to participatory development communication also clarifies specific points of entry necessary for corrective and/or additional intervention.

Therefore, by delving into what McClure (1992) calls the "politics of the quotidian" (cited in Rodriquez, 2001, p. 156) with a critical gaze, this study avoids the pitfalls of the four dominant schools of thought in the western social view: namely, atheistic evolution, egocentric competition, relativism and positivism. To be wedded to either school precludes "genuine development and social change" (Obomsawin, 1993, p. 5) or the efficacy of such in Waisbord's (2014) formulation of the problem. The implication is that efficacious development and social change processes necessitate reposing power and responsibility in people's hands, so they govern their own lives at the level of self, family and community. However, as established in the adaptation framework above, delving into the quotidian to optimize climate change communication oriented towards social change (transformation) is highly political, chiefly because it implicates the dominant logic that underpins societal construction and distinctly connects a multiplicity of prevailing and projected challenges. In fact, it raises fundamental concerns that have been at the core of indigenous and traditional knowledge debates, including the inaugural Indigenous Knowledge Monitor Symposium in the Phillipines (1993), chiefly, the value of and access to Indigenous Knowledge and intellectual property rights.

So, ethically, this study is committed to moving beyond instrumentalizing indigenous and traditional communities as indicators of a tipping point to empowering them to act to adapt to the changing climate more efficiently and progressively to the extent that their full range of vulnerabilities are considered. Consistent with eschewing essentialism and the pursuit of participation as an end, the study is geared at offering a basis for more efficient discovery of self-sufficiency and self-determination through the collective implementation of appropriate programmes in relation with exogenous actors, dissimilar worldviews and capacities. This relationist disposition, when enacted with the critical culture-centric gaze, is likely to yield

gradual rather than dramatic changes in cultural formations, which renders it compatible with the valuing of incremental victories across pathways towards transformation within the adaptive framework outlined below. As such, consistent with the eschewing of binaries in participatory approaches, the study adheres to a non-essentialist reading of culture. The conceptually nebulous notion of culture is defined by Shadid (2007, cited in van den Pol, 2010) as "a total of meanings or knowledge that human beings need to function in a certain situation: knowledge of language, habits, rituals, opinions, values and norms" (p. 1). Mobilizing such a broad tapestry of elements that underpins existence differentially in a non-essentialist fashion is important because climate change poses an existential threat to cultural retention and diversity so significant that Lampert (2010) calls for a cultural 'Red Book,' akin to the Red Book for Endangered Species. Culture also plays a consequential role both in the fashioning of climate change content and the way it is expressed (Shadid, 2007, cited in van den Pol (2010)). This is in accordance with a broader trend in comparative environmental policy that regularly foregrounds the disparity between the reactions of different population groups to ecological threats (Cohen, 2000).

Accordingly, this study conceives culture as a fluid social phenomenon to be considered as a dynamic, lived experience that "incorporates both lived practices and practical ideologies" (Couldry, 2003, p. 77). This is a key step towards moving beyond the limitations of pre-established cultural codes, including cultural identity and citizenship. The radical democracy thesis offered by feminists such as Mouffe and McClure (cited in Rodriquez, 2001 and Couldry and Curran, 2003) contests the essentialism invoked by pre-established cultural codes and recasts the political subject as fluid and emergent. Specifically, they do not deem social subjects as being constituted by essence associated with historical location. In other words, membership within a historically marginalized group should not be conflated with membership of a specified

interest group with specified demands (Rodriquez, 2001, p. 18). This view provides a more nuanced relationist perspective that incorporates notions of fluidity and contingency to describe culture and by extension identity as mutually dependent and eschew the existence of true essences and related staid conceptions. This shift in our understanding of pre-established existential givens—political, sociological and psychological—brings into question the communication studies perspectives from which cross-cultural communication and participatory development efforts are often interpreted in oppositional terms. This reductive view traps traditional cultures in an exclusive subversive mode, precluding the identification of broader dialectical trends in cultural formation and social change processes this study aims to examine and use to map a critical yet pragmatic course of action.

Specifically, this relationist conception of culture and the political subject in traditional and indigenous communities on the frontiers of climate change will aid me in unearthing the adaptive capacity of these cultures. Rather than being a mere fixed or calcified and fragile victim of climate change (Downey, 2013), this relationist reading of culture opens up avenues for contemplating endogenous communicative frameworks and optimized actions for adapting to climate change in much the same way traditional and indigenous communities have adapted to ecological change for millennia. Most importantly, it informs what content and framing is likely to be most resonant and yield the greatest range of positive social change in the medium term. This is a most consequential disposition as endogenous communications, particularly indigenous forms, which contrasts significantly with exogenous communication systems, bureaucracies and other formal systems, is often neglected (Mundy and Compton, 1993). This is untenable given the historical centrality of media in social change and the salience of culturally appropriate modes of communication. It is also consequential in that it opens opportunities to detail how

frames emerge, become stabilized and enable varieties of change across adaptation pathways in contexts where spatial and temporary factors, uncertainty and other widely accepted challenges deemed distinguishing factors do not complicate perception and frames resonance in the manner they are said to in the mostly generalized, Western and cosmopolitan oriented literature on climate change communications.

Finally, this relationist conception of culture and the broader culture-centric purview of communication for social change outlined means that when one delves within the quotidian and observes the decision-making processes, their enactment and the criteria that drive both in context, one shifts from merely uncovering psychological processes—which are useful to a diffusionist agenda (resilience/coping, and perhaps transition) but wholly insufficient to enable social change—towards marshalling communicative and policy understandings more useful for supporting the realization of transformation amidst climate change primarily on the terms of communities. This critical disposition is used [to map how] communication processes, strategies and tactics [that can be] mobilized to deal with … challenges" (p. ix) and realize change based on the nature of the adaptation process or pathway communities pursue.

Adaptation Pathways

Philosophically and practically, this study accords greater attention to the social justice aspects of adaptation. Adaptation is the response mechanism through which "win-win" outcomes are most likely and the modality through which the most vulnerable must act and frame their responses (Adger et al., 2006; Cohen et al., 1998; Galloway McLean, 2010; Howell, Capstick & Whitmarsh, 2016; Moser, 2017; Pelling, 2011; Swart et al., 2003). Further, there is substantial attention to equity issues in mitigation of climate change. Mitigation "is a core principle of the United Nations Framework Convention on Climate Change" (Adger et al., 2006, p. 2), although

limited to narrow concerns about citizenship and, political actions around emissions rather than "multiscale and multifaceted" conceptions warranted by climate change (Adger et al., 2006, p. 1). The lack of ethico-political attention to what is emerging as the most impactful and holistic locus of action, adaptation, therefore underscores why a reflexively participatory disposition underpins this dissertation.

The study examines a range of adaptation initiatives on the margins to see how they communicate the impacts and adaptation to ascertain the core elements. My hypothesis is that the communicative triggers for adaptation, which are fundamentally embedded across spheres of life with high perceptibility, are decisively different from those of mitigation and require greater focus on action to awareness than awareness to action. This endeavour may reveal the degree to which decision-making and institutional functioning impact the nature of effective adaptation action and the attendant communication process(es) required. This is a key step because at various scales in climate change: global (Backstrand, 2011; Biermann, 2011), regional (Kiwanuka-Tondo & Pettiway, 2016), national (Paavola, 2006) and all scales, including community (multiple (Pelling, 2011)), involves procedural and distributive justice (Adger et al., 2006; Figuerora, 2011; Routledge, 2011; Capeheart& Milovanovic, 2017; Gardiner, 2011), which are intertwined with multilevel institutions and procedures of collective action, primarily dialogic (Adger et al., 2006; Carvallo, 2008; Dutta, 2011; Moser, 2010; Regan, 2007).

While the culture-centric participatory framework outlined paves the way to pursue empowerment and articulate rights strategically, it is not explicitly primed for articulating and realizing justice as it manifests in the environmental domain. Although philosophically congruent with my disposition, the nuanced perspectives in the literature on the politics of hope (Bennett, 2011; Lear, 2006; McIntosh, 2008; Orr, 2011; Stoknes, 2015), much like critical

perspectives on participation and articulations of empowerment as ends within themselves, lack tools for action that can address the materiality of climate impacts with due attention to the multiple planes of action and likely outcomes. To attenuate this, Pelling's (2011) conceptualization of adaptation is integrated. Pelling's adaptation framework goes beyond the transitionality that characterizes Gardiner's (2011) view of the future amidst the Anthropocene and offers a structure for making sense of the pathways available to humanity that is useful for outlining the terrain of action and the material outcomes associated with the pathways pursued. Pelling (2011), the first to offer a comprehensive analysis of the social dimensions to climate change adaptation, conceives of adaptation as a dynamic process that presents an "opportunity for social reform, for the questioning of values that drive inequalities in development and our unsustainable relationship with the environment" (p. 9). This reading foregrounds power asymmetricities as consequential for climate change impacts and responses and is guided by Rawl's (year) normative framework (cited in Pelling, 2011) for the realization of justice that "prioritizes human rights over public good, holds the social contract between citizens and the state in dynamic tension" (p. 12) and calls for governance "principles that ensure inclusive governance and seek to enhance the quality of life of the poorest" (p.12). This normative frame is compatible with Gardiner's (2011) call for an "ethics of transition" (p. 319).

In concert with this view, Pelling (2011) offers a tripartite "resilience—transition—transformation" framework (p. 81) for delineating and probing the full range of adaptive choices that must be made at various levels across societies. These three layers are pathways or terrains of actions that clarify how varieties of the politics of hope can be enacted in a participatory fashion. The first, resilience, is consistent with the isolation and mild-rectification frame highlighted by Gardiner (2011). It "refers to refinement of actions to improve performance

without changing guiding assumptions or the questioning of established routines" (Pelling, 2011, p. 37), but compounded actions could result in tipping-points that lead to transition.

The second and third elements, transition and transformation, are significantly different (though not unrelated) as they allow for varying engagement with the socio-political elements embedded in this complex reality that one seeks to address. Transition, according to Pelling (2011), is tantamount to incremental social change; modest modifications are made and existing rights are exercised, which positions it within the mild-rectification and neutrality frames noted by Gardiner (2011). However, compounded incremental actions can lead to a tipping point towards more radical outcomes and it is these tipping points that are of primary interest. On the other hand, transformation includes the explicit assertion of/demand for "new rights and changes in political regimes" (Pelling, 2011, p. 3), particularly the enactment of bivalent justice mechanisms. Transformation therefore points towards "radical change" (Pelling, 2011, p. 10) and is the pathway of most theoretical and practical interest to me given my profound interest in responses commensurate with the challenge in the context of compounded vulnerabilities (historical and current). The power dynamics and inevitable contestations of this conceptualization of adaptation lay bare means, pathways or terrains of action that are not necessarily inequitable or equitable and context (physical and cultural) will be determinative.

The connections between all three levels or pathways for action, to the extent that incremental action at one end can result in action oriented towards other elements, even in a countervailing manner, warrant an understanding of climate change communication's role commensurate with an interest in the politics of hope in both the material and philosophical sense outlined. This is important because communication is essential for changing social systems (Gumucio-Dagron & Tufte, 2006; Rogers, 1962, 1973; Schramm, 1964). Further, the theoretical

frame presented makes clear that the future and invariably the climate change communication needed, is multiple. One can speak of communication for climate resilience, transition and transformation, which are unrecognized in contemporary climate change communications research. The contention is that optimizing climate change communication requires understanding the modalities commensurate with the differential challenges associated with each, delineating how reflexive and action-oriented communication can enable progressive and ethical tipping points towards the vanguard model (Gardiner, 2011), transformation (Pelling, 2011) or radical material realization of the politics of hope (Lear, 2006; McIntosh, 2008; Orr, 2011) and how communities and other adaptation actors enact these communicative acts. The multiple ways in which adaptation occurs—autonomous, spontaneous or passive and planned, per Carter (cited in Pelling, 2011); reactive, concurrent and anticipatory (Burton, Kates, & White, 1993), maladaptation (Moser & Dilling, 2007), their scale (Smit et al., 2000; Splash, 2007; Stern (2006) and time-horizon (Pelling, 2011) will also certainly impact the nature of the communication. It is for this reason that my theoretical frame is consistent with my decision to address this fundamental communication challenge that affects the pursuit of sustainable development within the field of communication for development and social change. Distilling the modalities commensurate with the differential challenges associated with each pathway and delineating the ways how communication can enable progressive tipping points towards transformation is premised on this study's privileging of Waisbord's (2014) reassessments of strategic diffusionist actions that eschew participatory binaries in favour of embedding strategic issues and actions, participation and co-equal communicative actions to achieve social change and empowerment. Guided by the non-essentialist view of culture adopted and Dutta's (2011)

culture-centric purview, this theoretical disposition is consistent with the communitarian perspective.

Conceptually, social change for empowerment and climate justice is congruent with the transformation pathway (vanguard model) and progressive tipping points leading towards such radical change that Pelling's (2011) framework highlights. Consistent with the culture-centric participatory purview this study privileges, the process is "directed at changing marginalizing social structures," which is distinct from efforts within the mainstream framework that seem to alter individual behaviour change (Dutta, 2011, p. 26). This ontological opening means how we conceptualize social change impacts the associated strategies developed and how they are implemented (Dutta, 2011; Gumucio-Dagron & Tufte, 2006; Melkote & Steeves, 2015) across adaptation pathways. The tipping points across adaptation pathways, for instance, typify the pursuit of strategic social change that foregrounds the role of communication solutions in addressing challenges associated with climate change. Specifically, "social change issues are framed within a broader communicative lens within which solutions are proposed and acted upon to bring about change in the social systems" (Dutta, 2011, p. 29).

So, quite consistent with my contextualization of the rationalization for this study, my theoretical disposition, which is underscored by conceptual and practical commitment to the critical assessment and improvement of development agendas, accords a functional role to communication as envisioned with the communitarian paradigm—notably, the examination of the role of "information, communication and the media in directed and non-directed social change, including a variety of practical applications based on the mainstreaming of communication as a "process" and the leveraging of media technologies in social change" (Thomas, 2014, p. 7). The privileging of change realized through "ongoing, culturally and

socially relevant communication, including dialogue among providers and clientele and within the recipient group itself" (Servaes, 2008, p. 15.) is indicative of the consensus in the literature that a dialogical social process is essential for enabling social change.

Conclusion

The chapter outlines a reflexive, holistic and critical culture-centric theoretical framework that enables the delineation of the varying roles and modes of activation for communication to aid the realization of three different levels of climate change adaptation actions. The theoretical framework outlined connects the discrete enterprise of climate change communications research with the established field of communication for development and social change, particularly participatory development communication and associated empowerment modalities associated with the Just Sustainabilities paradigm. In addition to clarifying insights on how communication ought to be employed amidst complex macrosociological change with geologic interconnections, this theoretical perspective shifts from a reductive and instrumentalist problem formulation that isolates a complex phenomenon. Instead, the reflexive and relationist disposition adopted lays bare the differentiating existential implications (human, non-human) and the fundamental societal reformatting and dissolutions at the level of the quotidian, multilevel systems and governance. This nuanced approach positions climate change as an urgent global challenge with long-term implications forsustainable development, questions of justice and equity. The next chapter offers a detailed presentation of the methodological procedure employed to pursue this critical agenda and make clear how the holistic and critical participatory culture-centric theoretical framework outlined guided those methodological decisions.

Chapter Four: Methodology

Both the extant literature and the critical-culture centric theoretical frame I have outlined indicate a fundamental ethico-political gap in climate change communication research that, at minimum, warrants special attention to be accorded to those disproportionately impacted by anthropogenic climate change. Traditional and indigenous communities that are sustained by their relationship with the natural environment are widely accepted to be among those disproportionately affected because of their low adaptive capacity, which is a product of a multiplicity of vulnerabilities that are variably connected or unconnected to, but exacerbated by, climate change. These vulnerabilities include historical atrocities such as genocide, slavery and colonialism; systemic injustices such as capitalist enclosure, infringement of rights (human, property and cultural); and a myriad of related low development indicators. This compounded existential threat that disproportionately affects the margins, the persistent challenges in crafting effective engagement modalities overall and those specific to their distinct cultural dynamics, as well as their current and anticipated exposure to unparalleled climate change warrants critical assessment at both the global and local levels for two fundamental reasons: first, the narrow and narrowing window of opportunity for effective action (urgency or existentialism); second and relatedly, a paucity of policy and programmatic interventions based on "the self-determination ethos, cultural values, human capabilities and dignity rather than the catch-up thesis (Ojo, p. 95, 2013)," which now underpins contemporary climate change action, including communication modalities and techniques, because of the existential impetus. Consistent with Graham (2001), who speaks to the socio-cultural and political nature of development, Ojo (2013) deems the latter to be consequential for sustainable development and social change.

To tackle this consequential gap in accordance with my ethico-political disposition, I have undertaken a critical assessment of global climate change communication processes (macro case/analysis) and the implications for social change in a cross-section of vulnerable traditional and indigenous communities where adaptation initiatives are underway (micro cases/analysis), and will articulate the foundations of a more robust global climate change communication agenda based on the various adaptation pathways they pursue.

My objects of study in this two-tier critical comparative analysis are a) the 1.5˚C to Stay Alive campaign in relation to the Paris Agreement (2015) on Climate Change and b) three original multilayered case studies in relation to global climate change communication processes, including the COP agreement and the 1.5˚C to Stay Alive campaign. The first (macro-level) critical case has been selected because it uniquely permits analytic generalization about the potential of climate change communications to shape outcomes in domains of power (global policy-making). It is important to probe this global campaign alongside the discrete country cases because it articulates the needs of the most vulnerable nation-states and people to climate change at a landmark juncture. Particularly, the campaign held the scientific and moral high ground in articulating an existential concern, functioned amid unprecedented global public support, consensus in climate science, and with the clout of the improbably named "high ambition coalition." The landmark nature of the Paris Agreement, a culmination of more than 30 years of antagonisms that involved more than 195 countries committing nationally determined action plans, also underscores the distinct opportunities my case selection presents for understanding if and how attendant contentious climate (and environmental) justice ambitions can be advanced successfully using cogent multilevel campaigns.

The macro-level analysis outlined is complemented by an examination of the efficacy of theories and modes of communication used in climate change communication and strategy in both conceptual and practical terms when leveraged to enable social change in diverse micro-contexts (economically, socially, culturally, ethnically and climatically). The study includes three original qualitative case studies focused on indigenous and traditional communities spanning 17 villages across Belize (four), India (seven), and Fiji (six) where climate adaptation initiatives are underway (see Appendix D). My country cases were systematically selected to reflect the economic, social, cultural, climatic and geographic diversity of climate vulnerability and risk affecting indigenous and traditional communities globally. This collective case approach, which includes both coastal and farming communities, enabled me to interrogate how dominant and external climate change communication modalities interact with traditional (indigenous) retentions in key livelihoods sectors that are directly impacted by both traditional practices and climate change. Crucially, the collective case approach facilitates triangulation, which will enable me to outline a set of globally relevant recommendations about how best to optimize communication processes in indigenous and traditional communities in accordance with their adaptation pathways that go beyond the narrow focus on the Global South that only accounts for a specific economic, geographic and climatic reality.

Paradigmatic Considerations

To empirically study people's adaptation actions/community adaptation pathways and delineate how they arrive at and pursue these decisions necessitates both a theory and methodology for studying their decision-making processes. Consistent with Gladwin's (1980) study of non-adoption of agronomic recommendations, I employ a theory of choice whereby "people, in choosing between two alternatives, do not make complex calculations of the overall

worth or utility of each alternative" (p. 10). As such, people use procedures to simplify their decision-making processes. Gladwin (1980) states:

> Hierarchical models or trees, with decision criteria at the nodes or branching points of the tree, can represent such procedures. […] A decision tree is thus a sequence or series of discrete decisions criteria, all of which have to be passed along a path to a particular outcome or choice. (pp. 11).

Analytical units are individually (codes) and collectively (thematic groups/code groups) employed in this study to map these decision-making processes. Given the complex nature of the problem under investigation, the centrality of context and culture in structuring vulnerability, adaptive capacity, perception and action, as well as their interrelatedness, I delved into the quotidian to discover the particular criteria decision makers use in specific contexts to move beyond unconverging the mere psychological processes involved (as Gladwin (1980) did and many of his contemporaries do), which, though useful to a (neo)diffusionist or instrumentalist, is insufficient to enable the transformational social change this project privileges. Indeed, delving into the quotidian is resource intensive as (Atton (2014), Gladwin (1980), Moser (2010) and Rodriquez (2001) note, but it offers a unique opportunity to contribute critical baseline information necessary to enrich macro level pronouncements, guide action at multiple levels and is of evaluative significance from a project perspective. In concert with my theoretical frame, I primarily used focus groups and interviews to unearth people's reasoning rather than positivist instruments that yield facts and data as they would be inconclusive when patterns of action, core decisions/indecisions, degree of adaptive capacity and vulnerability are observed.

These elicitation techniques reflect a conscious effort to use appropriate methodologies culturally (highly oral contexts) and ethically (balances literacy variance where they exist). The extensive

participant observation the researcher invested in this project includes living among and working with most of the study populations during the seven-month data collection process, as well as the settings in which interviews and focus groups were conducted (e.g. around ritualistic "grog sessions" and honorific events in Fiji). This reflects both the researcher's commitment to the ethico-political and culture-centric purview that underlies the project and an overall commitment to Barker's (1980) contractual view of the data collection process. Barker (1980) notes:

> The data collection process is part of a social contract between a researcher and local people, and cultural context in which they are to be used, and are tailored to the abilities and requirements of the community in which he works (p. 301).

So, consistent with Barker (1980), I have found a compromise between the field techniques of anthropology and those of mainstream western social science, but while I eschewed the centrality of questionnaires, I do not entirely subscribe to Warwick's (1973, cited in Barker, 1980) contention that participant observation and survey research are two extremes of a continuum of techniques (p. 305). In fact, I fully recognize that there are more useful frameworks than this survey-participant observation continuum, but their full exploration would warrant prohibitive resources.

Research Questions

My complementary macro and micro level cases are motivated by two sets of questions. The first, the macro-level case, includes five questions. In exploring these questions, I will undertake a comprehensive critical case analysis that contextualizes the *1.5˚C to Stay Alive* campaign's success in shaping the Paris Agreement with due consideration to scientific consensus, global policy structures, policy, ideology and economics, as evidenced by the critical

ontological disposition outlined in my theoretical chapter. A similar outlook will characterize my interpretive framework, particularly my determination of success and broader methodology. The first set of questions is as follows:

1 On what basis are proponents of 1.5˚C to Stay Alive proclaiming success?

2 How does the manner in which the campaign demands are included in the Paris Agreement (2015) advance and/or undermine its emancipatory potential?

3 What factors contributed to the success and/or failure of the 1.5˚C to Stay Alive campaign?

4 What lessons do the 2015 iteration of the 1.5˚C to Stay Alive campaign present for future climate change campaigns from the Global South?

5 How do global and national climate change communication processes reflect the voices, needs and traditions of indigenous communities?

The second set of questions concern the interface between global or macro level climate change communication efforts and traditional and/or indigenous retentions. These questions are:

1 What principles, communication modalities, messages and channels drive or are used in climate change communication aimed at indigenous and traditional communities?

2 What retentions exist in indigenous and traditional settings that are or can be used to adapt to a changing climate?

3 Are traditional and indigenous practices included in official climate change communication planning and action? a.) If yes, how? b.) If no, why not?

4 How are climate change communication campaigns and programmes accounting for indigenous culture (food sources, farming and building practices, health, employment options), climate perceptions, attribution of cause, knowledge levels, climate risk and aspirations (food sources, farming and building practices, health, employment options)?

5 How do various indigenous and traditional demographics (clans, tribes, gender, employment and status, various group/activity membership, education and age) view and respond to climate change?

6 How do indigenous and traditional communities conceive of climate justice?

7 What similarities and differences are there in indigenous and traditional conceptions of climate justice versus global narratives, namely the 1.5 to the South-South led Stay Alive Campaign?

8 How can climate change communication aimed at indigenous communities be used to improve livelihoods?

9 What can global climate justice efforts learn from indigenous and traditional communities?

10 How should global climate justice movements incorporate indigenous and traditional notions of climate justice?

11 How can global climate change responses better reflect indigenous and traditional experiences and aspirations?

The Macro-Cases

My analysis of the *1.5˚C to Stay Alive* campaign includes a close reading of the campaign platform in relation to the Paris Agreement (2015) and semi-structured qualitative interviews. The campaign operated on two levels: a) the general audience pop-culture thrust, including videos, social media postings and a website; b) the negotiating platform that clearly articulated an 11-point demand anchored by the title of the general audience campaign. I examined the campaign's success using a coding procedure in two stages—coding the campaign documents and focusing on the Paris Agreement. Both stages of coding were conducted line by line using the qualitative analysis software, ATLAS.ti. I used this software because it produces various automatic outputs suitable for multilevel analysis of complex coding of policy documents. Using this tool, I reviewed the demands articulated at both levels of the campaign and critically assessed if and how they are captured in the Paris Agreement. To achieve this, I used a case specified discursive rubric (coding), outlined in Table 2 (below), to examine how many of the campaign demands are captured in the Paris Agreement and how they are taken into account. In

enacting this discursive process to determine the campaign's success, a critical interpretive frame that is consistent with my ontological and broader methodological approach, especially keen attention was paid to the campaign's core demands: one, four, eight and 11 (see Figure 1). My discursive rubric for representation of campaign demands includes probity for unqualified inclusion (as intended), modified inclusion with precision (such as differing financing commitments and differing temperature rise limits), qualified inclusion (if, when, upon investigation) or included but made optional, as detailed below.

Upon completion of my close reading of the 11-point campaign platform, I reviewed rolling updates published by the campaign on its official website in the 30 days preceding and following the Paris Conference (a six-week period), including issue highlights/briefs, news summaries and the campaign's official song, to identify how accurately they reflected the official 11-point demand and what points were emphasized (frequency). I coded the material using an eleven-point numbering system to identify demands that are reflected in the general audience campaign and the frequency with which they are championed. The numbering or coding of campaign demands in the Paris Agreement (2015) corresponds to the numerical listing of each campaign demand as represented in the campaign's official publication, "How important is COP 21?" (CCCCC, 2015). Simultaneously, I coded for twelve categories of information to ascertain a more granular and substantive understanding of the official 11-point campaign demand that featured in the general audience material. The categories were designed to reflect the emphasis of each of the eleven campaign demands.

Table 2: Discursive rubric employed for the macro-case.

Category	**Demand**	**Description**
Protocol	1, 11	Statutory nature of the agreement and applicability
Adaptation	2	Proposals/activities that will improve/transform systems to withstand climate change-induced impacts (except compensation for past damage and general financial mechanisms)
Loss and Damage	3	Assessment and redress for past damage, including financial compensation for damage already done. Excludingcapacity building activities, adaptation or coping measures

		that aren't expressly compensatory
Mitigation	4	Activities aimed at limiting/curbing climate change, include temperature targets, exclude technological transfer and monitoring of mitigation commitments
Technology	2,9	Transfer of machinery/equipment and software. Exclude transfer of technical training on processes (capacity building) and funding for technology (finance)
Capacity Building	2	Skills building and exchange activities, excluding the transfer of technology, adaptation proposals and compensation frameworks
Monitoring	5, 10	Review cycles for mitigation activities and implementation of adaptation mechanisms, exclude specific activities/actions
Verification	5, 10	Provisions for measuring reporting and authenticating commitments
SIDS	6, 9	Provisions focused on the special circumstances of Small Island Developing States (SIDS)
Frontiers	7	Provisions for supporting the needs of vulnerable developing countries (exclude SIDS)
Finance	8	New/expanded climate financing mechanism, exclude SIDS specific and frontier specific provisions
Compliance	11	Mechanism to ensure enforcement/adherence

I established frequency using ATLAS.ti's query tool that produced a formatted Excel output with an overview of code frequencies by documents that was further filtered to facilitate varied comparisons. This procedure enabled me to determine the degree to which the core of the platform was advanced. Points of emphasis (tallies of frequency) are assigned chronological alphabetic ranking from A (strongest) to L (weakest).

Similarly, I conducted a rudimentary content analysis (underpinned by the alpha-numerical and categorical systems articulated) to identify if, how and the frequency with which the campaign demands are captured in the Paris Agreement (2015). Upon completion of my first engagement with the Paris Agreement, another reading was undertaken using ATLAS.ti to note how the campaign demands are captured. A symbolic system was employed to demarcate campaign demands that are captured in the same terms (unqualified), modified (included with precision, such as a specific financing commitment that differs and specific temperature rise target that differs) and those advanced with caveats (if, when, upon investigation). Campaign demands that are rendered optional and those that are explicitly rejected are independently coded. Upon completion, the software was used to produce a series of reports to facilitate a comprehensive review of the findings of my content analysis. This comprehensive review was

undertaken in conjunction with another review of the campaign's 11-point platform to establish which campaign demands are excluded. Campaign demands that are unaccounted for are interpreted as an implicit rejection or an ad hoc measure that can still be realized bilaterally.

Interviews and Sample Selection (Macro-Case)

To bolster the legitimacy of my critical case analysis, I probed my findings by conducting semi-structured interviews with two randomly selected representatives from the Caribbean's climate change negotiating team. The two interviews were semi-structured because this approach best facilitates probity and contextualization of the findings realized from my extensive coding. This exercise was conducted after my content analysis and critical comparative reading of the campaign platform in relation to the Paris Agreement (2015). The interviews were intended to test and probe my findings, specifically why the core of the campaign fared as I have determined (partially successful) with respect to the Paris Agreement and the framing of the broader set of demands. This exercise in probity strengthens my critical case analysis by enabling me to accurately contextualize my findings, specifically around areas I have identified as successes and failures.

The probing procedure outlined is of high importance as it will buttress the potential of my study to inform future climate action by ensuring key challenges, networks and/or relationships, procedures, among other things, are noted. So, contextualization is central to my analysis and inclination toward praxis. I sought this through interviews as it is not sufficiently discoverable through the coding of my object of study—nor is it actionable and meaningful enough when contemplated solely within the conceptual framework I have constructed. Through semi-structured interviews, I tapped into the subjects' unique insights from their involvement in the crafting of the specific campaign demands and key role in negotiating for them during COP

21 in Paris. This process yielded nuances about why some demands were achieved, while others are parsed, rejected or are unaccounted for that enriched my analysis beyond the purely conceptual reading of global environmental politics that motivated this study.

My interview sample has been limited to two representatives from the Caribbean region for convenience as negotiators change frequently and require onerous clearance procedures to speak given their sensitive roles. However, the sample is representative because of broad uniformity in policy articulation and proclamation of success in identical terms across the island blocs. Crucially, too, my sample of two independently conducted interviews facilitated triangulation, which enabled me to capture nuances and posit highly contextualized findings about the reasons for the nature of the campaign demands' inclusion and exclusion from the Paris Agreement.

As anticipated, the critical analysis of the campaign within the context I have posited revealed that the intractable nature of global climate change politics undermined its emancipatory potential and lacks nuanced contemplation of cultural idiosyncrasies, including traditional retentions and practices that can be leveraged for effective action in vulnerable contexts.

An Overview of the Micro-Cases

The macro-level analysis outlined is complemented by an examination of the efficacy of theories and modes of communication used in climate change communication and strategy in both conceptual and practical terms when leveraged to enable social change in diverse micro-contexts (economically, socially, culturally, ethnically and climatically). The study includes three original qualitative case studies focused on indigenous and traditional communities spanning 17 villages across Belize (four), India (seven), and Fiji (six) where climate adaptation initiatives are

underway (see Appendix D). My country cases were systematically selected based on established institutional connections (non-governmental organizations, regional institutions and university research departments) across borders that could reflect the economic, social, cultural, climatic and geographic diversity of climate vulnerability and risk affecting indigenous and traditional communities globally. This collective case approach, which includes coastal, farming and hinterland communities in conservation zones, enabled me to interrogate how dominant and external climate change communication modalities interact with traditional (indigenous) retentions in key livelihoods sectors that are directly impacted by both traditional practices and climate change. Crucially, the collective case approach facilitates triangulation, which will enable me to outline a set of globally relevant recommendations about how best to optimize communication processes in indigenous and traditional communities in accordance with their adaptation pathways that go beyond the narrow focus on the Global South that only accounts for a specific economic, geographic and climatic reality.

The 17 field sites or villages were selected systematically from field lists (documents with project descriptions and the names of villages and hamlets where they were implemented) provided by five organizations and one independent community animator or ICA (the Pacific Centre for Environment and Sustainable Development (PaCE-SD) and Professor Joeli Veitayaki (an ICA) in Fiji; Protection of Remote Agency and Guaranteed Action for Tribal Improvement (PRAGATI) Foundation and Laya Foundation in India; and Ya'axche Conservation Trust and the Caribbean Community Climate Change Centre (CCCCC) in Belize). The 17 villages are associated with seven distinct climate adaptation projects (two each in Belize and India, three in Fiji) and were implemented by the five organizations and an ICA that provided the master lists from which the systematic site sampling was enacted. As outlined in Appendix: Countries-

Projects-Villages, two projects were implemented by PaCE-SD under different mechanisms at different times in Fiji.

The organizations and ICA were identified based on a mixture of publicly available databases about climate change adaptation projects implemented no longer than five years prior to the Paris Agreement i.e. 2010 to the present (PaCE-SD in Fiji); the researcher's environmental network (the ICA in Fiji; PRAGATI Foundation and Laya Foundation in India; and Ya'axche Conservation Trust in Belize), and pre-existing relationships (CCCCC in Belize). They were engaged based on availability and willingness to disclose project details, be interviewed and connect the researcher with the communities in which they worked. In exchange, the researcher provided cost-neutral consulting support on a range of non-related institutional priorities.

After establishing these institutional relationships, the researcher systematically selected a representative sample of villages from the field lists provided by each entity using all the applicable criteria outlined below, in addition to some subset (village/project site clusters) peculiarities non-randomly established around the axis of the first macro-level criterion. These contextual determinations are detailed in the more granular description of the sampling procedure for each subset in the subsequent section. However, the four operative criteria employed are:

1. Exposure to at least one climate change and/or environment-oriented project up to five years prior to the Paris Agreement (COP 21)
2. Communities are marked by farming and/or coastal activities
3. Resident populations are primarily officially classified as indigenous/traditional
4. Communities are homogeneous in terms of caste

Consistent with the highly contextualized culture-centric purview that guides this project,

the fourth macro-level criterion only applies to the Indian case for complementary ethical and scientific reasons. In other words, the application of the fourth criterion allowed the researcher to simultaneously respect the yeoman endogenous strides made in limiting the destructive impulses of casteism (ethics) without compromising to account for a key cross-social group dynamic (caste identity) where it is present and actively structures the sociological order, including undermining adaptive capacity (scientific).

The third criterion is especially important as any discussion of indigenous peoples begins with controversy (Fleras, 1999). As such, I have employed the practical definition of indigenous people set forth in my introduction (one of three outlined by Niezen (2003) that is consistent with my theoretical framework's non-essentialist and nuanced relationist reading of culture in accordance with Couldry and Curran (2003) and Mouffe and McClure (cited in Rodriquez, 2001). However, all my indigenous villages fit the three definitions (legal or analytical, practical and collective) outlined by Niezen (2003).

The second criterion ensures the case is consonant with the impetus of the overall study, which is to accord special attention to the experiences and prospects of those most vulnerable to climate change impacts due to the centrality of their connectedness/existential relations with the environment. It is therefore intended to enable me to interrogate how dominant and external climate change communication modalities interact with traditional retentions in key livelihoods sectors that are directly impacted by both traditional practices and climate change. The first criterion uniquely allows me to link the micro-level cases with the macro-level case and the broader intention to optimize climate change communication at multiple levels.

My field engagement spanned seven months – two months in Belize and India and three months in Fiji. However, both the Indian and Belizean cases followed prior engagements.

Previously, I conducted 24 semi-structured interviews and five site visits in India with the requisite university level ethics approval for a related climate justice project. I also returned to Belize having worked there extensively, with established regional, national and community level relationships and institutional support that were readily activated to pursue the case, which uniquely combines opportunities to study climate change in an indigenous community context on both the mainland and tropical island spaces.

This seven-month qualitative study includes textual analysis of project documents associated with the seven climate change adaptation initiatives (Belize – two, India – two and Fiji – three) underway in my study sites, including communication aimed at my units of analysis during the project, extensive participant observation, several site visits to project installations, 55 semi-structured focus groups and 22 semi-structured individual interviews. Both focus groups and individual interviews were conducted using a common set of guiding questions (See Appendix O).

Table 3: Overall Sample Profile

Sample Profile	Adult Pop. In Field Sites	Sample of Adult Pop.	Households in Field Sites	Households Sampled	Men	Women	Focus Groups	Individual Interviews	Youth
Total	1581	300	548	258	159	141	55	22	121
Rate		19%	47%		53%	47%			40%

Per Table 3, the study has an overall sample population of 300 (Belize 74, India 121, and Fiji 105) drawn from 19 percent of the adult population and 47 percent of households in the combined field sites. The sample composition is also marked by high macro-group variation and representativeness in terms of gender (47 percent women) and age (40 percent youth – between 18 and 30 years old) (see Appendices: Sample Profile Fiji, India and/or Belize). While the

sample size is moderate at only a fifth of the total adult population in the combined field sites, it is consistent with and accompanied by methodologies commonly used to draw inferences for developing broad theoretical conclusions and recommendations.

Overall, participants were recruited using a relatively fluid non-random quota procedure that accounts for a combination of factors: engagement with the climate change activity underway in their community (direct or indirectly), the nature of their engagement with the project (collective or individual), gender, age and ethnic identity. The researcher eliminated education and livelihood roles as factors because of uniformity in educational levels and the conformity between gender, age and livelihood roles, which is captured by the age and gender-oriented focus group format outlined below. A cross-section of the factors were outlined and socio-cultural dynamics were used to determine when, how many and who were invited for semi-structured individual interviews and whether a subsequent focus group was needed for triangulation and probity of particularistic factors.

Consistent with the culture-centric theoretical frame outlined and the contextual nature of the sampling procedure, in particular, the sampling technique varied to some extent (e.g. the ethnic factor was only relevant in the EU-GCCA-Seaqaqa Subset in the Fijian case), but logically across villages and will be detailed for each village subset in the subsequent section. However, focus groups were generally conducted with four cohorts defined by gender (two male and two female cohorts) and age (two older (over 30 years old) and two younger (between 18 and 30 years old)) and included four to six persons drawn from different households (non-random quota procedure). There are three notable exceptions. First, the Gau island villages in Fiji, where gender was a differentiating factor in terms of direct engagement and socio-cultural

imperatives (status, rootedness and gender) dominated such that it merited individual interviews with a specific subset of older men (16 across three villages) rather than focus groups.

Second, the Trio Village from the Ya'axché Conservation Trust subset of villages in Belize, where an additional focus group was held with members of the Trio Cocoa group, a distinct group of cocoa farmers who are managing a landmark agroforestry concession area in which climate-smart agriculture is being pursued. This group merited special attention as it transcends standard demographic variables and may reveal distinct interpretations, knowledge levels and perceptual valence relevant for boosting engagement and adaptive capacity in an integrated manner (climate change and livelihoods). It also uniquely allowed the researcher to tap into what Moser (2010) sees as a paucity of cross-social group comparisons in climate change communication research to see how group identity other than the standard macro markers impact climate perceptions.

Third, instances where socio-cultural, inter-ethnic and economic dynamics altered the demographics of the villages such that some cohorts were absent (young people in general (San Miguel Village in the Ya'axché Subset in Belize, or young women in particular (Nellikota Village in the Laya Subset in India)), opportunity sampling was warranted to account for gender and ethnic representativeness (EU-GCCA-Seaqaqa Subset in the Fijian case), and a mixture of individual interviews and focus groups were used for directly engaged project beneficiaries to probe clusters of knowledge (Gau Island Subset in Fiji), as well as to account for climate change impacts on inter-ethnic relations (EU-GCCA-Seaqaqa Subset in the Fijian case).

The consonance between age, gender and sectoral or livelihood roles in each context (e.g. women go fishing or source household protein in Fiji or tend household gardens in India and Belize, while men source staples for household consumption and some commercial prospects,

build homes and tend to animals) means the sampling approach yielded focus groups that were prime for probity well above the researcher's anticipation. It afforded probity for clusters of knowledge, awareness, practices, aspirations, agency, perception of risk, cause, responsibility, action and inaction about key areas of climate vulnerability across critical macro group nodes.

Fiji Sample Profile

Table 4: Fiji Sample Profile

Fiji	Adult Pop. In Field Sites	Sample of Adult Pop.	Households in Field Sites	Households Sampled	Men	Women	Focus Groups	Individual Interviews	Youth
Total	498	105	196	126	56	49	13	6	33
	Rate	21%	64%		53%	47%			31%

The Fijian case includes a sample population of 105—56 men and 49 women. The sample was drawn from six field sites (villages and settlements) on three different islands. The selected sites include Malawai Village and Lamiti Village on Gau Island; Seaqaqa, an atypical multi-ethnic, tripartite settlement (Rokosalase, Navudi, and Navai) on Vanua Levu; and Yaqaqa Village, the sole community on Yaqaqa Island.

The six field sites were selected using three macro-level factors:

1. Exposure to at least one climate change and/or environment-oriented project prior to the Paris Agreement (COP 21)
2. Resident populations are primarily and officially classified as indigenous or traditional
3. Communities are marked by farming and/or coastal activities

Initially, in all instances, the sites or village subsets selected using the criteria above were among a range of other villages that have benefited from the same intervention (the first selection criterion). So, consistent with the critical culture and contextual ethos of the project, the first criterion was used as an entry point and formed an axis around which key project level

sampling refinement decisions were made. This contextual determination is consistent with the non-random selection procedures employed at the macro level.

Seaqaqa

The tripartite multi-ethnic settlement of Seaqaqa was identified as the sole project beneficiary of an European Union – Global Climate Change Alliance (EU-GCCA) adaptation initiative implemented by PaCE-SD. Navai, the most engaged of the three settlements was initially identified as a field site, but the researcher determined that studying all three sections of the settlement was feasible, consonant with the cross-group and culture-centric purview and met the selection criteria. This is primarily because of the distinct ethnic configuration in the settlement, which offered a unique opportunity to see how a rare inter-ethnic composition (iTaukeis and Indo-Fijians living in proximity) in the Fijian context is or could be affected amidst climate change impacts, action and observable differences in adaptive capacity. Crucially, the atypical inter-ethnic composition conforms with selection criterion two.

Yaqaga Village

Yaqaga Village, the only population on the island of Yaqaga Island, benefited from a climate change adaptation initiative supported by the United States Agency for International Development (USAID) that was implemented by PaCE-SD in three villages across two of the three provinces in Vanua Levu (Yaqaga village in Bua Province and the villages of Korotasere and Vusasivo in Cakaudrove Province). Yaqaga Village was selected because of two factors that manifestly exacerbate its vulnerability: a) it is the most isolated (only island of the three and with no road network, etc.); and b) is the only village of the three without a creek and/or river.

Gau Island

The Vanouso Tikina Project was implemented across villages on Gau Island at various periods by Professor Joeli Veitayaki, an ICA who is from the island (Kai Gau), specifically Malawai Village (Kai Malawai). It was determined that focusing on a sample of the six villages (now five free-standing entities) that have been engaged the longest (from the pilot phase) would be most useful. Malawai Village was selected because it is one of only two villages that demonstrated a lack of preparedness to commence the project but is the only one that was still a free-standing village/settlement. Lamiti was selected because it was among the three free-standing villages with the most challenges (Vanuas and Nacavanadi), all of which overlapped, so proximity (or convenience) to Malawai (the first site), as well as the fact that it now hosts the residents of Naovuka (the remaining pilot), which had the most reported challenges during the pilot. This resulted in three of the six pilot villages being sampled on Gau (or two of the five currently free-standing villages), which provided a representative look at the intervention.

These three sites are distinct in terms of composition and the nature of the climate change intervention to which they were exposed. Therefore, a non-random context/culture-centric procedure that accounts for gender, age, livelihoods practices and engagement with the climate change action/interventions in the community was used to identify a representative sample for both semi-structured interviews and focus groups. See Appendix E for village-level sample profile and data.

Sampling in Fiji

Seaqaqa

The sample includes 30 people (34 percent of the adult population). It includes 13 women and 17 men. Three specialist interviews were conducted with individuals who held singular

roles associated with the settlement (selected based on their role rather than gender). These three individuals do not reside in the village and as such are not included in the sample totals. The significant divergence in the gender composition of the sample for the Seaqaqa village subset is a consequence of contextual factors, namely the absence of young women due to marriage, the pursuit of education in urban centres and general depopulation induced by limited opportunities and a downturn in the viability of the sugar industry, the main economic activity in the area. (See Appendix E for village-level sample profile and data.)

No official gender disaggregated data exists for each section of the cane-farming belt as they do not form independent political entities. However, women represent 43.33 percent of the interviewed participants, which is indicative of a representative sample on two counts: first, high overall representativeness in terms of households reached as the sample included at least one person from 92.06 percent (58 of 63) of households; second, the comparable gendered representation, despite the general absence of young women from the village, which suggests men outnumber women substantially. Household representation was determined through both recruitment and pre-interview (individual or focus group) vetting by strategically engaging people from different households and asking new recruits about the households they belong to, respectively. Only five couples were interviewed.

A mixture of focus groups, individual interviews, participant observation while living in the settlement for two weeks and site visits to project installations were employed in Seaqaqa. I conducted six focus groups (four with men and two with women), seven individual interviews (six with men and one with a woman), as well as three specialist interviews that were warranted by contextual imperatives (general communal leadership structure with direct responsibility for the project, among other things (an Advisory Counsellor); an institutional beneficiary of the

project (Headmaster of the local school); and relevant opportunity sampling (the presence of a corporate sugar representative).

Sampling Procedure

Interviewees were selected using culture and context-centric non-random selection criteria that account for gender, age, livelihoods practices, engagement with the climate change action/intervention associated with their village and the atypical ethnic diversity in the three sections of the settlement. Opportunity sampling for individual interviews was utilized twice in accordance with these criteria in instances where ethnic and age distribution were in flux.

The Seaqaqa sample included six individual interviews with primary project beneficiaries, two from each of the three sections of the settlement that were engaged by the EU-GCCA project. The near homogenous ethnic make-up of each section ensured a representative distribution of both Indo-Fijians (traditional population) and iTaukeis (indigenous population). These primary project beneficiaries were all middle-aged men by virtue of the gendered nature of work and land ownership patterns (men farm and generally own/manage the land as women tend to move for marriage etc.).

Six semi-structured focus groups were also conducted using the criteria outlined. The first of these focus groups functioned as a testing group to probe the views of the individually interviewed primary project beneficiaries that also afforded the researcher an opportunity to observe the inter-ethnic and cross-locality interactions in this atypical multi-ethnic, tripartite Fijian settlement. To facilitate the testing procedure, the individually interviewed men were all invited to participate in a focus group. Four of the six participated. The other four focus groups included two with older men, one with younger men, two with older women. There was no focus group for younger women because of their absence from the settlement due to customary

migration for marriage, pursuit of education in proximal or distal conurbations and general depopulation induced by limited opportunities and a downturn in the viability of the sugar industry, the main economic activity in the area. Young men, too, are largely absent due to the same factors (except marriage) and opportunity sampling was used to interview, one young man who met the selection criteria, in order to broaden the subset as only three participated in the focus group, and my non-random procedure requires a minimum of four for each cohort. Two focus groups with older men (other than the testing group) and women were conducted to ensure representativeness across the three sections of the settlement being studied. For men, one of the focus groups included four men (three from Navundi and one from Navai, both sections are occupied by Indo-Fijians), so a third was conducted with three men from Rokosalase (occupied by iTaukeis) to ensure consistent and representative sampling across various areas of the settlement that invariable captures the ethnic composition.

Of the two focus groups with women, the first included seven participants, the majority (five) of which were from Navai (one each from Rokosalase and Navundi). So, a second was held, which was attended by five women, four of whom are from Navundi. As such, the researcher used opportunity sampling based on the criteria to interview one woman from Rokosalase to achieve a more representative distribution of women across the three sections of the settlement: Navai – five, Navundi – five and Rokosalase – three.

Young men (18 to 30), also largely absent from the village due to the factors outlined above, were only found in the Rokosalase settlement. A focus group was held with the three men who met the criteria, including residency—which was imperative as transient workers were in the area—and an individual interview with a fourth (opportunity sampling, as described above).

These interviewees were selected based on customary associative patterns, specifically their membership in a cane-farming gang and belongingness to the settlement.

With respect to older men, I conducted six individual interviews with primary project beneficiaries (men over 30) and three focus groups. As outlined above, the first of these focus groups functioned as a testing group to probe the views of the individually interviewed primary project beneficiaries, which also afforded the researcher an opportunity to observe the inter-ethnic and cross-locality interactions in this atypical multi-ethnic, tripartite Fijian settlement. To facilitate the testing procedure, the individually interviewed men were all invited to participate in a focus group. Four of the six participated. The second focus group included four men (three from Navundi and one from Navai), so a third was conducted with three men from Rokosalase to ensure consistent sampling across various areas of the settlement that invariably captures the ethnic composition.

Yaqaga Island: Yaqaga Village

This sample includes 21 persons, which is more than a quarter of the adult population on the island. It includes eight women and 13 men. As with Seaqaqa, young women are largely absent from Yaqaga Village, the only population centre on the entire island, due to the pursuit of education in proximal and distal conurbations, customary practices that cause women to move for marriage, as well as transient seasonal work opportunities on neighbouring islands with more infrastructure and opportunities**. (**See Appendix E for village-level sample profile and data.)

Sampling Procedure

Interviewees were selected using a culture and context-centric non-random selection criteria that accounts for gender, age, livelihoods practices, engagement with the climate change action/intervention associated with their village and the traditional structure of the village

(*matanqalis* – clans comprising relatives, which includes *toka tokas* – discrete or individual family units). Owing to the village's small size, dense web of familial ties and the communal rather than targeted nature of the disaster risk reduction (climate change) intervention associated with the community, as well as the culture-context selection framework employed, semi-structured focus groups and participant observation were the primary methods employed at this field site over a two-week period living among the population. Four focus groups and two individual interviews were conducted. However, the two semi-structured individual interviews were conducted based on opportunity sampling. The first was done to achieve representativeness for the younger women category and was done in accordance with the criteria. The second was used to probe insights from an older male about his inventiveness that emerged across focus groups.

Consistent with the approach at other field sites, the focus groups were conducted with age-based gendered categories to ensure the sample captures the most salient macro-group or demographic categories in the village: women over 30 (five), men over 30 (eight), young men i.e. 18-30 (five), and young women i.e. 18 - 30 (two). In addition, the researcher ensured each focus group included at least one representative of each *toka toka* (family) from each *matanqali* (clan) that had a full-time presence in the village (three of four). The focus group with older men included both the head of each *matanqali* (traditionally all men, except in one instance where a woman chief deffered leadership to her eldest brother) and the head of a *toka toka* (one in each, in this village) and/or his *matavanua* (spokesman, also from the same family or clan).

Gau Island: Malawai and Lamiti Villages

The sample includes 54 interviewees (26 men and 28 women) drawn from across two neighbouring villages (Lamiti and Malawai), which represents 27 percent of the adult population

in both villages (54 of 203); and 52 percent of all households (49 of 95) of the combined village populations. (See Appendix E for village-level sample profile and data.)

The sample included 16 individual interviews (nine in Lamiti and seven in Malawai), six focus groups (three in each village) and participant observation over a three-week period. Interviewees were selected using a culture and context-centric non-random selection criteria that accounts for gender, age, livelihoods practices, engagement with the climate change action/intervention associated with their village and the traditional structure of the village (*matanqalis*/clans, which includes *toka tokas*/families). The 16 individual interviews include one with a religious figure from Malawai that was conducted to further probe a religious current that emerged during the focus groups, a methodological decision that is consistent with the contextual reflexivity that underpins my research agenda. The other 15 semi-structured interviews were conducted with directly engaged participants from each household in each village. Given the culture/context-centric methodology, they were selected using the traditional structure that maps proportionally with households in the village.

Specifically, the head of each *toka toka* (family) in each of the seven *matanqalis* or clans (four in Lamiti and three in Malawai) that had full-time presence in the each of the two villages. Of the four *matanqalis* or clans with their 11 corresponding *toka tokas* (families) in Lamiti (four in Tacilevu; three in Burelevu and Naocoqolo each; and one in Salavova), 10 met the criteria but an eleventh interview is also included in the sample (opportunity sampling) as one of the first order interviewee's health necessitated aid from his son, whose insights significantly influenced the primary interviewee and on many counts emerged independently and was captured accordingly. In Malawai, of the three *matanqualis* or clans with their seven

corresponding *toka tokas* (three in Nauluvatu and Kasavu each; and one in Namuani), six met the criteria. All these individual interviewees were men.

However, sampling them individually was necessitated by an even broader range of distinguishing factors. Cultural and contextual realities such as belongingness/rootedness, which is expressed as Kai Malawai or Kai Lamiti (born and raised in the village), is almost exclusively held by men as women move elsewhere for marriage. These rooted interviewees, who reflect a representative sample of the households and all *matanqalis* (clans) and *toka tokas* (families), were also most likely to be directly engaged in the project and could draw upon a longer range of observational knowledge about the context and the specific climate adaptation initiative underway in their locality. This approach, therefore, allowed the researcher to access historical insights about climate change induced-impact in the study site that is unique to these men who are the most rooted segment of the village population.

Consistent with the approach at other field sites, the six focus groups were conducted with age-based gendered categories to ensure the sample captures the most salient macro-group demographic categories in the village: two with women over 30 (15 participants: seven in Lamiti and eight in Malawai), and two with women below 30 (13 participants: seven in Lamiti and six in Malawai), and two focus groups with men below 30 (eight participants: four in each village). Consistent with the selection criteria outlined, the researcher ensured each focus group included at least one representative of each *toka toka* (family) from each *matanqali* (clan) that had a full-time presence in the village (three of four). No focus group was held with older men in this village because saturation of views was quickly observed, which suggests their views were sufficiently captured in the semi-structured individual interviews. The absence of social fault-lines (such as ethnicity in Seaqaqa) in this communal context did not necessitate a focus group.

Unlike Yaqaga Island, which has a similar communal and traditional structure, the Gau Villages were large enough and engaged in a more comprehensive set of climate change activities to necessitate individual interviews.

The India Sample

Table 5: India Sample Profile

India	Adult Pop. In Field Sites	Sample	Households in Field Sites	Households Sampled	Men	Women	Focus Groups	Youth
Total	645	121	133	62	66	55	8	53
Rate		19%	47%		55%	45%		44%

The sample for the Indian case is 121 (66 men and 55 women). The sample (see Table 5) was drawn from Adivasi hamlets or indigenous tribal villages that are associated with two distinct climate adaptation initiatives.

The seven field sites were selected using four macro-level factors:

1. Exposure to at least one climate change and/or environment-oriented project up to five years prior to the Paris Agreement (COP 21)
2. The communities are marked by farming and/or coastal activities
3. The resident populations were primarily officially classified as indigenous/traditional
4. The communities are homogeneous in terms of caste

Consistent with the critical culture-context purview that guides this project, a fourth macro factor was needed to identify the field sites in India (factor four). As described in the methodological overview, it was employed for complementary ethical and scientific reasons. Ethically, it allowed the researcher to honour the yeoman endogenous strides made in limiting the destructive impulses of casteism (ethics); and scientifically, the researcher could honour his ethico-political consciousness without compromising on accounting for a key cross-social group dynamic (caste identity) where it is present and actively structures the sociological order, including undermining adaptive capacity.

Using this rubric, seven Adivasi hamlets or indigenous tribal villages were selected from across East and West Godavari in Andhra Pradesh, South India. Consistent with the critical culture and contextual ethos of the project, the first criterion was used as an entry point and formed an axis around which key project level sampling refinement decisions were made. The climate change activities used as my entry way were led by two entities: PRAGATI and Laya Foundations. Both social service organizations coordinate a myriad of activities variably associated with climate adaptation across hundreds of indigenous tribal hamlets, so project/organization-specific criteria were crafted to complement the four macro-factors and identify a representative subset of villages from the larger set that met the macro-criteria. Representativeness was established by prioritizing those exposed to core rather than tangential climate change and environmental activities.

Accordingly, the four hamlets associated with the PRAGATI project were determined using the following criteria: two to four villages that have benefited from at least two of the following adaptation project activities: 1) community forest management; 2) nursery and plant distribution for ecosystem strengthening; 3) land and water development. Similarly, villages associated with the Laya project were determined in accordance with the following criteria: two to four villages that have benefited from at least two of the following three project activities: 1) community forest management (especially the System of Rice (and Ragi) Intensification (SRI) and agroforestry); 2) Low carbon farming; 3) women who participated in the learning and education programmes and project leadership activities. Where multiple villages met the criteria outlined, geographical spread, community reception to outsiders and convenience were used to select sites. See Appendix F for village -level sample profile and data.

The Belize Sample

Table 6: Belize Sample Profile

Belize	Adult Pop. in Field Sites	Sample	Households in Sites	Households Sampled	Men	Women	Focus Groups	Youth
Total	438	74	449	70	37	37	15	35
Rates		17%	16%		50%	50%		47%

Per Table 6, the sample for the Belizean case is 74 (37 women and 37 men). The sample was drawn from four villages and is associated with two distinct climate adaptation initiatives that were implemented in dissimilar and discretely settled ethnic communities (Quiché Mayans, an indigenous population and Creoles, a traditional community).

The four field sites were selected using three macro-level factors:

1. Exposure to at least one climate change and/or environment-oriented project prior to the Paris Agreement (COP 21)
2. Resident populations are primarily, and officially classified as indigenous or traditional
3. Communities are marked by farming and/or coastal activities

Using this approach, four villages were selected – three Quiché Mayans in southern Belize, and one Creole village in western Belize. Consistent with the culture and context ethos of the project, the first criterion was used as an entry point and formed an axis around which key project level sampling refinement decisions were made. The climate change activities used as my entry way were led by two entities: Ya'axché Conservation Trust, ostensibly an NGO, and the Caribbean Community Climate Change Centre (CCCCC), a regional organization. Both entities coordinate a myriad of activities across communities, so project/organization specific criteria were crafted to identify villages exposed to their core rather than tangential climate change and environmental activities. Accordingly, only one village, Flowers' Bank Village, was studied for the Caribbean Climate Community Project as it was the only village engaged under the selected

project: The Cohune Palm Nut Renewable Energy Project (henceforth, the Cohune Palm Nut Project). The communities that benefited from the project implemented by Ya'axché Conservation Trust were Trio, Medina Bank, Indian Creek, Golden Stream, San Miguel and Silver Creek, of which three (Trio, Indian Creek and San Miguel) were selected based on the following criteria: engagement: Trio has had the most sustained engagement under the project and is the biggest beneficiary with the agroforestry concession in Maya Mountain North Forest Reserve; all other villages had comparable levels of engagement and outcomes and Indian Creek was selected because it is the most recent village in the subset to be engaged by Ya'axché. Given the comparability in engagement levels across the remaining villages, San Miguel was selected to account for geographical distribution across the MGL reserve area (variation in inter-village location and dispersal across the reserve).

No individual interviews were conducted because project beneficiaries were engaged collectively at demonstration sites, workshops and groups meetings. Therefore, focus groups were conducted in all villages in four cohorts defined by gender (two male and two female cohorts) and age (two older and two younger), including four to six individuals drawn from different households. Consistent with the contextual nature of the sampling procedure, an additional focus group was held in Trio with members of the Trio Cocoa group, a uniquely organized group of cocoa farmers in the MGL region who are managing a landmark agroforestry concession area in which climate-smart agriculture is being pursued with support from Ya'axché. Cocoa farmers in the village who are not members of the group were excluded. As detailed in the methodological overview, this group merited special attention as it transcends standard demographic variables and may reveal distinct interpretations, knowledge levels and perceptual valence relevant for boosting engagement and adaptive capacity in an integrated manner (climate

change and livelihoods). It also conforms with my critical contextual and culture-centric purview that uniquely allows me to address what Moser (2010) sees as a paucity of cross-social group comparisons in climate change communication research and contribute to collective understanding of how group identity other than the standard macro markers impacts climate perceptions. See Appendix G for village-level sample profile and data.

Method of Analysis for the Micro Cases

The study is fundamentally committed to privileging the views of the study population. This endogenous culture centric philosophical commitment is evident in the researcher's use of grounded theory. Codes and themes were all developed progressively based on close reading of the transcripts from each study population in each country and then systematically collating similar representations to form fluid code groups (See Appendix A). The analytical units evolved progressively with each additional country case (See Appendix B and C, respectively).

An array of data sources was used in this multi-staged second phase of the study, including the review of project documents and reports for seven projects, 28 interview transcripts, 60 focus groups transcripts and copious field notes progressively compiled during participant observation and site visits. The multi-staged analysis yielded a progressively developed codebook or rubric with 173 defined codes and 20 meta analytical units called code groups or themes (see Appendix A). However, as detailed in Appendix A, only 15 of the code groups or themes are relevant for the study overall. Five are solely for the demarcation of contextual information relevant for understanding projects conceptually and operationally (four specific to the project documents: Project Framework, Project Action and Causes Profiled, Project Outcomes, Project Activities; and one associated with the transcripts: traditional practices. Further, the code group schooling is non-functional due to the near uniform nature of

educational levels across all study populations. The remaining 14 thematic units constitute the core analytical framework employed by this study for each country case. The progressive development of this framework, which is premised on the coding procedure detailed below for each country in consequential order, makes clear the remarkable resilience of the interpretative framework, particularly the meta analytical units (code groups). Data analysis for each country case was conducted in each field country during the research period indicated below. The analysis was done in accordance with a common three-tiered, progressively granular analytical framework that is detailed in the section following the progressive, country-level description of the coding process that gave rise to the analytical rubric presented in Apprendix A.

Fiji (August 1 to October 30, 2017)

On completion of data collection in the first field country (Fiji), the researcher enlisted the services of two transcribers from the field contexts with the requisite bilingual linguistic competence warranted by the socio-linguistic environment to generate detailed transcripts in soft copy format. Hardcopies of the transcripts were reviewed, followed by first cycle-coding free-coding (manually). This process entailed demarcating meaningful segments within the transcripts that are resonant with the core research questions or informed the researcher of contextual realities. A mixture of discrete codes, a word or short phrase that succinctly captures the demarcated utterances and "in-vivo" coding (verbatim utterances of high significance that could not be immediately linked, condensed or defined) were employed. On completion, the data was reviewed and all "in-vivo" codes were assigned discrete codes. A total of 133 codes were identified, collated and defined to establish a referential rubric or codebook. The data was then imported into the qualitative analysis software, ATLAS.ti, and a second-cycle coding exercise was enacted to identify the ideas embedded in the data set using the rubric established.

To minimize the occurrence of errors during the coding process and improve the internal reliability of the data set, two interviews were coded separately by two coders prior to performing the second-cycle of coding. Each coder was given a copy of the 'codebook' which explains and illustrates what each code signifies (see Appendix A for the final codebook, and Appendix B for the first or Fijian iteration). The inter-coder reliability rate was found to be 84 percent. The high inter-coder consistency is largely due to two factors: a) the use of a linguistic taxonomy (codes) derived from rather than projected onto the transcripts; b) relatedly, the codes emerged from a stable experiential and interpretive range (similar contexts and culture) about discrete actions, customs, perceptions, angsts, natural events and shared livelihoods. The marginal inter-coder inconsistency is in part due to the coder's perception of overlaps between some codes. This was confirmed upon completion of the second-cycle coding process and the production of reports showing the prevalence of codes that allowed similarities and relationships between and among codes to be more readily noted.

India (November 2 to December 30, 2017)

On completion of data collection in India, the researcher enlisted the services of two transcribers with the requisite bilingual linguistic competence warranted by the socio-linguistic environment in the field contexts to transcribe the focus groups and generate electronic transcripts that were manually reviewed using the rubric established in Fiji, while adding new, discrete and "in-vivo" codes to label data fragments that were definitionally non-associative with the rubric. On completion of this manual, first-cycle coding, the researcher reviewed and refined the list of codes by varyingly combining linked references that inferred similar sentiments but were differentiated by a) socio-linguistics (teri-tree planting, mangrove, among other tree planting references associated with preventing erosion became "tree planting/aforestation" while

tamboo, no catch, no take became tamboo/no take); geologic/environmental features (mountain, hill, beach and river erosion became soil erosion, while concerns interpolating proximity to waterways, e.g. coastal dwellers and river dwellers became "Coastal/Riverside Dwellers"). In addition to linking commonalities, the researcher noted the new codes that emerged due to context (primarily due to the physical location – forest reserve versus coast, culture, nature of the project intervention – integrated or targeted domains) and transformed the "in vivo" codes into discrete codes. A total of 23 new codes were identified, defined and incorporated into the referential rubric or codebook and one code was modified to make it more encompassing (see Appendix C). The data was then imported into the qualitative analysis software, ATLAS.ti, and a second-cycle coding exercise was enacted to identify the ideas embedded in the data set using the rubric established.

Consistent with my approach in Fiji, I assessed the reliability of the rubric prior to conducting the second-cycle of coding. This was done to minimize the occurrence of errors during this crucial second-cycle coding process, gauge the internal reliability of the data set and sustain the integrity of the study. Two interviews were coded separately by two coders prior to performing the second-cycle of coding. Each coder was given a copy of the expanded 'codebook' which explains and illustrates what each code signifies (see Appendix A for the final codebook, and Appendix C for the subsequent Indian and Belizean iterations). The inter-coder reliability rate was found to be 78 percent. Despite a marginal fall in the inter-coder reliability rate, the researcher proceeded with high confidence as the rubric showed remarkable resilience across vastly distinct experiential, environmental, linguistic, cultural, climate adaptivity and country contexts.

Belize (January 5 to March 15, 2018)

Similarly, on completion of data collection in Belize, the researcher enlisted the services of three transcribers with the requisite trilingual competence warranted by the socio-linguistic environment in field contexts to transcribe the focus groups and generate electronic transcripts that were manually reviewed using the evolving rubric. As with India, new, discrete and "in-vivo" codes were added to code data fragments that were non-associative with those already established. On completion of this manual, first-cycle coding, the researcher reviewed and expanded the rubric. A total of 11 new codes were identified, defined and incorporated into the referential rubric or codebook (see Appendix A for the final codebook, and Appendix C for the subsequent Indian and Belizean iterations). The data was then imported into the qualitative analysis software, ATLAS.ti, and a second-cycle coding exercise was enacted to identify the ideas embedded in the data set using the rubric established.

Consistent with my approach in both Fiji and India, I assessed the reliability of the rubric prior to conducting the second-cycle of coding. This was done to minimize the occurrence of errors during this crucial second-cycle coding process, gauge the internal reliability of the data set and sustain the integrity of the study. Two interviews were coded separately by two coders prior to performing the second-cycle of coding. Each coder was given a copy of the expanded 'codebook' which explains and illustrates what each code signifies (see Appendix A). The inter-coder reliability rate was found to be 81 percent. This high inter-coder reliability, in addition to two other critical factors, motivated the researcher to proceed with high confidence. First, there was varying consonance with both Fiji and India in terms of climate adaptivity, experiential and environmental factors. Specifically, the nature of the two climate change projects underway in Belize were varyingly similar to the those in India (agroforestry oriented); both were enacted in

interior or hinterland contexts similar to all the Indian sites, and the tripartite settlement of Seaqaqa in Fiji (3 of 7 sites in that case).

Experientially and environmentally, the field sites in Belize also had significant geological formations (rivers and hillsides) that are also present in the Indian case that directly impacts climate change and livelihood experiences and responses (e.g. Flowers Bank Village is on the banks of the Belize River and the Indian Hamlet of Agraharam is on the banks of the River Krishna; homes are perched on unstable hillsides in Belize (Flowers Bank), India (Polusumamidi and Agraharam) and Fiji (Gau Island)). This high level of consonance on the counts detailed contributed to a second factor that sustains confidence in the rubric: the rubric showed remarkable resilience. The rubric's resilience is evidenced by the absence of the need for further refinement of the improved units of analysis (namely the merging and multi-focal/referential expansions enacted in India). This is a consequence of the levels of consonance noted, the researcher's growing confidence and deep cultural and relevant professional ties to Belize. At a macro level, these observations are reinforced by the nature of the new codes added to the rubric. The majority (eight of 11) is associated with contextual imperatives: i.e. related to the peculiarities of the project (three project actions) or locality specific challenges (five angsts, which are functions of context and culture).

Data Analysis: A Three-tiered Procedure

Upon completion of the coding exercise in each field country, ATLAS.ti was used to produce a series of reports that were exported in Microsoft Excel format to facilitate varied assortative adjustments and comprehensive review of the data. This report production and comprehensive review was undertaken systematically in each field country at three levels:

1) Macro-level: An overall thematic and code review to ascertain a top-level country and project view. This involved generating two sets of tables for each cluster of villages (village subsets) associated with each project: three in Fiji and two each in India and Belize. The first showed thematic prevalence and the second showed code prevalence for each village subset. This provided an overall picture of the code and thematic prevalence for each country case and enabled the researcher to make a range of top-level comparisons across project interventions. Tables showing thematic prevalence are presented throughout each case. However, macro-level group data are presented in the appendix. See Appendix H.1 to H.12, I.1 to I.12 and J.1 to J.12 for Fijian projects on Gau Island, Yaqaga Island and Seaqaqa, respectively; K.1 to K.12 and L.1 to L.12 for Indian projects associated with PRAGATI and Laya, respectively; and M.1 to M.11 for Belizean projects).

2) Meso-level: A comprehensive thematic analysis of village or project subsets to examine how various populations process climate change experiences, including the enactment of climate adaptation efforts associated with the identified project. This thematic analysis was enacted non-randomly. Each project or village subset was analyzed comprehensively in a logical thematic order that ensured the researcher could gauge thought development based on manifest thematic relationships, make associations and connect insights that progressively revealed or suggested decision-making patterns about climatic and project experiences, perceptions and responses (See Table 1). This is a methodological decision that is consistent with the theory and model of decision-making that guides my study. To undertake the thematic analysis of each village or project subset in the logical order established, a table was generated for subsets showing the prevalence of each code in the relevant theme or code group for each transcript (labelled using the age-gender, or other macro-group e.g. Cocoa Farmer's Group in Trio Village,

Ya'axché subset, Belize). Each thematic analysis at the meso level was done gradually in relation to code prevalence (highest to lowest). At this stage, thematic and code comparisons across villages was conducted, observations established, expressed quantitatively (totals, ratios, percentages), while simultaneously re-examining the transcripts, my field notes and recollection to capture illustrative quotations, probe and contextualize the quantitatively suggested or emerging patterns. All cross-group (gendered, aged, specialized) comparisons at both the inter- and intra-village level (age, gender and engagement level analysis) remained uncontemplated until the third level of analysis;

3) Micro-level: An analysis of the resonance of codes (prevalence) across villages, the age-gender axis (young men, young women, older men, older women) and engagement level (e.g. Trio Cocoa Farmer's Group). During this granular analytical exercise, holistic thematic and code comparisons were made at the macro-group level both inter and intra village(s), respectively. Observations were established and expressed quantitatively (totals, ratios, percentages), while simultaneously re-examining the transcripts, my field notes and recollection to capture illustrative quotations, probe and contextualize the quantitively suggested or emerging patterns. Drawing on the rich tapestry of data and experiential knowledge uniquely allowed the researcher to contextualize gendered variances by interpolating socio-cultural and engagement factors. The detailed examination of macro-group variances within and across villages also allowed the researcher to identify outliers (a product of various factors) that further contextualize quantitatively suggested trends with varying valences along the gender-age and experiential axes. On completion of the thematic analysis for the villages associated with a project, the researcher proceeded with analyzing the data for other discrete projects in the same logic fashion. On completion, the analysis of the village subsets associated with each project is collectively

reviewed to further enrich the marco-level observations drawn and more revise the progressive linkages drawn between and/or across themes due to manifest cause/effect and correlative relations made clear by the logical order of the thematic review.

Chapter Five: Global Power & Politics: 1.5˚C to Stay Alive vs The Paris Agreement

The quest to reconcile social justice with environmental protection has been central to negotiations and discussions at every major international meeting on sustainable development since the 1972 environment and development conference in Stockholm (Roberts and Parks, 2007, p. 2). The tension between these two constructs, which manifest materially in terms of social, livelihood, economic and ecological costs, is pronounced in international climate change negotiation processes. This is especially so where the interests of the Global South—large emerging market economies such as India, Brazil and China—and the Global North collide. So central has this source of contention been that ahead of the 15th session of the Conference of the Parties (COP 15) to the United Nations Framework Convention on Climate Change (UNFCCC) in December 2009, the Alliance of Small Island States (AOSIS) which includes the highly vulnerable nations of the Caribbean and Pacific regions, framed their negotiating stance as "1.5˚C to Stay Alive". The reprise of the existential "1.5˚C to Stay Alive" frame as a public campaign, alongside formal negotiations, ahead of the landmark Paris Agreement in 2015, therefore, offers a near optimal point (and objects) of inquiry into the tensions between social justice and environmental protection. This chapter offers a critical assessment of concerted efforts by Small Island Developing States (SIDS) to articulate, navigate and realize the inclusion of climate action priorities in the landmark Paris Agreement in 2015. This probing of efforts by the most vulnerable but least powerful states to articulate climate action priorities within the most consequential global climate change negotiation process, pays keen attention to issues of power and their myriad manifestations locally, namely through transnational policy articulation and the nature and scope of action.

Core Questions and Roadmap

Accordingly, this chapter probes four issues: 1) How do the power differentials structure climate change policy formulation? 2) Do the way the campaign demands are included in the COP 21 agreement undermine its emancipatory potential? 3) What factors contributed to the success of the 1.5˚C to Stay Alive campaign? 4) What lessons do the 2015 1.5˚C to Stay Alive campaign present for future campaigns from the Global South? In a quest to answer these questions, this chapter first contextualizes the environment in which international climate change politics, policies and action is unfolding. As highlighted in the theoretical chapter, contextualizing the policy environment is imperative because global climate change policy formulation structures the nature and scope for climate change action across geo-political levels. The analysis pays keen attention to the deployment of influence through varyingly linked institutional mechanisms at the international, regional, national and sub-national levels using Stone's networked reading of policy formulation, transfer and translation. Subsequently, the chapter reflects upon the campaign demands and consider how each demand is reflected in the Paris Agreement to establish the degree of success attained by the campaign in more precise terms than the generalized proclamations of success by campaign proponents. This critical comparative analysis will be leveraged to contextualize how and why each campaign demand is accounted for in the Paris Agreement using insights made amenable by the networked policy diffusion and translation (for action) conceptual frame.

As indicated in the methodology chapter, this analysis is intended to yield findings that will form the foundation for future efforts to map a course of action for other South-South efforts such as the call for loss and damage, more ambitious climate financing and broader actions that advance the climate justice narrative in tangible ways. So, in pursuit of this improvement in

praxis, the chapter concludes by highlighting significant strategies that enabled and constrained success based on the examination of the object of study: the 1.5˚C to Stay Alive campaign demands in relation to the Paris Agreement.

Networked Policy Diffusion, Reformulation and Enactment

Stone's networked reading of policy formulation, transfer and translation is especially congruent with my theoretical articulation of the consequential nature of climate change impact and actions manifesting differentially across micro, meso and macro levels, while the scope of action necessitated by the Just Sustainability paradigm—climate justice in particular, is multi-scaled and global. Stone's networked framework uniquely enables the contextualization of the multidimentional reformulation of the phenomenon, differential emphasis on mitigation and adaptation from stakeholders across the globe and the levels of support accorded to varied thematic emphases that underpin robust climate change action. These thematic emphases include technology transfer, climate finance, loss and damage and adaptation in Small Island Developing States (SIDS) and low-laying developing states. Very much in accordance with this study's focus on multi-scaled integrated climate change actions, Stone's networked reading of global policy formulation foregrounds the role of a tapestry of actors unconfined to the state. Leveraging this multi-organizational perspective, which the extant policy diffusion and translation literature construes in a primarily statist and intergovernmental manner, enables this study to probe the important role played by international organizations, private interests, the third sector and knowledge-based actors in structuring the range and nature of local adaptive efforts studied, cross-national experiences and the global climate policy agenda. This is especially important given that PANOS Caribbean and other regional NGOs, rather than individual states or

intergovernmental entities, such as AOSIS, led the iteration of the campaign under scrutiny (2015).

Furthermore, PANOS's informal and ad hoc connection with the official Caribbean and AOSIS negotiating machinery and embeddedness in international structures through a range of funding relationships and collaborations reinforce the need for a critical networked reading. Emblematically, the lead entity, PANOS Caribbean, is a regional non-for-profit organization that aims "to amplify the voices of the poor and the marginalized through the media and ensure their inclusion in public and policy debate, in order to enable Caribbean communities and countries to articulate and communicate their own development agenda[s]" (PANOS, 2019, para 2). However, this manifestly politically conscious Caribbean entity that, among other things, tackles environmental issues in accordance with this study's participatory communication for development perspective, is chiefly funded by extra-regional entities. PANOS's wide-range of primarily non-Caribbean funders include large NGOs and foundations, such as Catholic Relief Services and the Open Society Institute, respectively. Other funders are as varied as the official British, American and Nordic bilateral development agencies, national bodies such as the National Institutes of Health (USA) and supranational entities such as the European Union (EU) and several UN agencies. The structuring effect of funding in development activities through the prioritization of programmic activities means PANOS' actions and leadership of the campaign is likely influenced by a multiplicity of factors in a myriad of non-linear ways.

The networked perspective is also distinctly primed for probing the structuring impact of these multidimentional relationships and their associated goals. Consistent with the eschewing of binary dispositions and essentialism detailed in the theoretical chapter, the networked reading of the formulation, diffusion and enactment of policy ideas "stresses the role of agency, […] the

logic of choice, cognition and interpretation of circumstances or environment and (bounded) rationality in imitation, copying and modification by decision-makers" (Stone, 2001, p. 1). This liminal disposition underscores the differing political modalities of policy transfer (emulation, harmonization, elite networking and policy communities and penetration) and variability with which climate change policy diffusion functions even where direct support underpins organizational relationships. This nuanced perspective of policy diffusion and reformulation also includes divergence where negative or partial lessons are drawn (Ladi, 2000) and structures action at various levels. So, the policy network literature also "offers a method for understanding the politics of inter-organizational [or multi-actor] policy transfer [and outcomes]" across geo-political levels (Stone, 2001, p. 14). In particular, it lays bare the manner in which networks are increasingly cultivated and managed by states and international organizations both coercively through conditional reform and aid mechanisms (penetration) and less explicitly coercive mechanisms such as convergence. Convergence is fostered by interdependence and the high cost of divergence, which means international regimes establish norms that structure or harmonize the expectations of actors. Emblematically, convergence within supranational bodies such as the EU, which takes a unified view on climate change action and global commitments, means PANOS Caribbean's direct and indirect dependence on the supranational entity through the official development agencies of Britain and the Nordic member states heightens the extent to which European climate policy priorities is likely to structure its programming.

So, the networked perspective of climate change policy formulation, diffusion, reformulation and enactment aligns with the constructivist culture-centric disposition outlined as a foundational element of this study. Its emphasis on sociality and the emergence of inter-subjective understandings transcends what the neo-Gramscian perspective is likely to deem as a

"process bounded by power [and] symptomatic of the spread of neoliberal hegemonic practices via knowledge networks" (Stone, 2012, 490). In fact, it foregrounds the salience of transfer, influence and motive patterns more akin to a pastiche. Emblematically, there is heightened import of knowledge in the international political economy, the emergence of inter-governmental and inter-sphere forms (state, private and third sector formations) of governance, including increasingly interdisciplinary evidentiary bodies such as the Intergovernmental Panel on Climate Change (IPCC) and 'policy entrepreneurs' (Kingdon, 1984) who promote policy ideas. More fundamentally, Stone's conceptual tools clarify critical actors, namely the third sector and funding agencies, who are deeply engaged in the transfer of ways of knowing and seeing the world across geo-political levels, which has implications for the nature of climate actions privileged even on the margins of society because adaptive actions, particular the most consequential ones, are costly, often technically advanced and necessitates external support to establish and/or boost low capacity. The consequential nature of networked diffusion of climate change policies and actions and penetration of geo-political spaces, therefore, underscores the importance of this study's employment of a critical participatory communication theoretical perspective that is both culture-centric and action-oriented. Specifically, the penetrative salience and consequences of networked diffusion show that the nature of the communicative processes adopted is central for mediating the interface between prevailing knowledge systems or worldviews and those transferred or diffused. In fact, it is likely determinative of the ethico-political significance of climate change actions.

Contextualizing International Climate Change Politics

The emergence of the global climate change public policy network and the context in which the campaign under scrutiny emerged typifies why governments and international

organizations increasingly cultivate and manage frameworks for policy learning and action. Confounded by the geologic scale, likely permanence and initial uncertainty about its cause, several interdependent actors composing of NGOs, government and international organizations sought to tackle the shared geologic challenge through "information exchange, collaborative independent research, debate, a search for solutions and appropriate policy responses" (Stone, 2001, p.14). This gave primacy to knowledge generation, information and analytic resource sharing necessary for policy formulation within and beyond the network. The emergence of a global climate change policy network gave rise to a range of "complex interrelationships between stakeholders and societal coordination" (Frohlich and Knieling, 2013, p. 9) at the global level, which inform action at the local level through policy articulation and crucial resources. This constitutes a governance structure with vast influence and is of great consequence for the realization of climate justice. Specifically, global structures such as the United Nations Framework Convention on Climate Change (UNFCCC) and the Nobel prize winning United Nations Intergovernmental Panel on Climate Change (UN-IPCC), functions as the chief policy and research orbits, whereas findings are readily diffused because of the wide adoption of the discourse and practice of knowledge and learning within international organizations. These organizations include the Global Environmental Facility, which facilitates a range of innovative and experiential initiatives, the Bretton Woods institutions (the World Bank and the International Monetary Fund), regional and national development banks and western development agencies.

Furthermore, these institutional mechanisms, alongside the Green Climate Fund and the Global Adaptation Fund, form the core of climate finance funding, which reinforce the power of the global climate policy network that structures the orientation of global action on climate change. Akin to the GEF, the World Bank effectively leverages its knowledge base to diffuse

policy and programmatic approaches through initiatives such as the Global Development Network and the World Bank Institute (WBI). The WBI has a dedicated Environmental and Natural Resources Group for the cross-sectoral inclusion and promotion of sustainable development through programmes such as the Environmental Economics and Policy Network (Stone, 2004). This culture of knowledge exchange through cultivated networks results in the development of norms that foster both voluntary and involuntary policy adoption. Voluntary adoption is most common where the risks are greatest and internal capacity is most constrained (the Global South). As outlined earlier, it is fostered through both emulation and elite networking. However, involuntary diffusion is enabled by norm adoption through climate policy harmonization processes, such as climate risk and vulnerability assessments for development interventions. The Caribbean, which boasts an advanced intergovernmental climate change research and programmatic mechanism, including a United Nations Institute for Training and Research (UNITAR) ranked centre of excellence, is emblematic of these voluntary and involuntary mechanisms. The Caribbean Community Climate Change Centre (CCCCC), which leads policy and programmatic formulation based on extensive sector-specific climate modelling for the region, which offers precision absent from global modelling, is primarily presented in economistic and cost frames, as observed in the Belize Chapter with the adaptation project it managed in Flowers Bank Village and the risk management tool described below. This is likely a result of voluntary adoption of norms through elite networking processes and emulation brought forth by the embeddedness of Caribbean scientists in transnational scientific networks, including collaborative modelling efforts with European research centres and universities, namely Newcastle University and University of East Anglia.

Akin to harmonization within supranational bodies such as the EU, diffusive lesson and knowledge sharing means of enabling climate policy convergence such as elite networking and emulation are not manifestly coercive. However, they function alongside coercive or penetrative forms of policy diffusion. In the Caribbean scenario outlined, the totality of the over US$50 million in climate adaptation activities undertaken by CCCCC (2004 to 2014), which crafts the basis for Caribbean specific policy responses such as those articulated in the campaign under scrutiny, was sourced from external bilateral partners, primarily the EU and member states (CCCCC, 2015). In fact, the CCCCC's operating budget, much like that of PANOS Caribbean, is chiefly determined by project fees earned from their primarily externally funded programmes. So, policy diffusion and formulation are also likely structured by the longstanding practice of conditional programmatic inclusion, sectoral prioritization and other facets. In fact, the embeddedness of sustainable development, including contemporary practices of variable attentiveness to climate change, within the modernist development programming of both international and bilateral development agencies has been the primary means of global policy diffusion to the Global South over the last 70 years (Peters, 1997; Stone, 2001). While not as frontally coercive (penetrative in Stone's formulation) as the World Bank and the International Monetary Fund's explicit demand for reform in exchange for development financing during various iterations of structural adjustment programmes, climate change-influenced objectives are both conditionalities for funding and measures of success in development programming across levels (international, regional, bilateral, third sector and increasingly the private sector). The Caribbean Development Bank, for instance, a regional variant of the Bretton Woods financial architecture, requires the use of the Caribbean Climate Online Risk Assessment Tool (CCORAL) to determine the climate sensitivity and risk management needs of the projects it funds.

Poignantly, CCORAL was developed by the CCCCC with financial support from the British state funded Climate and Development Knowledge Network and technical support from Acclimatise, a London-based climate consultancy indicative of the knowledge entrepreneurialism the networked perspective foregrounds as critical actors.

However, voluntary and involuntary diffusion of climate change policy ideas and scientific facts among international organization, states, the third sector and other actors based on the findings generated by the global policy and scientific orbit materializes differentially. In some instances, translation and institutional limits undermine the efficacy of policy adoption and results in maladaptations at the level of policy and outcomes, as illustrated within Pelling's (2011) politically inclined climate adaptation framework. However, a more decisive mitigating factor in the global climate change discourse has been the variable ways in which the diffusion of climate change policy ideas and knowledge has been adopted. The transnational policy literature from which Stone draws inspiration points to the situated nature of policy learning, which challenges the assumption that the diffusion of policy concepts is direct and singular. The notion of "learning" expressed as policy is contingent upon "cognition and the redefinition of interests on the basis of new knowledge which affects the fundamental beliefs and ideas behind policy approaches" (Hall, 1993, cited in Stone, 2001, p. 9). This suggests that policy transfer is a social and collective process founded on exchange between groups, which necessarily bring to the fore their own pre-existing dispositions. As outlined by Goldstein and Keohane (cited in Levy and Kolk, 2002), beliefs or ideology are central to the formulation of policy positions and outcomes, namely worldviews, principled beliefs and causal beliefs, even where they are drawn from a shared knowledge base such as the IPCC. Ideas, they contend, ''define the universe of possibilities for action.'' This brings to the fore issues of culture, religion, rationality, emotion,

ethnicity, race, class, gender, identity and historical experiences as pivotal factors in structuring how we perceive the world in which we operate. Indicatively, historical experiences, identity, culture and spatially informed rationality manifestly account for the Caribbean and AOSIS's consistent policy support for contentious ideas such as the reparatory demands embedded in 'loss and damage' (see campaign platform) inspite of their dependence on primarily European states for climate financing and technical support.

The centrality of a wide-range of socio-cultural subjectivities and their varied national and regional import in structuring and articulating national interpretive frames further underscores the generative value of the networked perspective for critically examining the efficacy of a campaign for collective and ambitious global action emanating from the global margins. It clarifies how this South-South effort successfully advanced a primarily existential message built around notions of climate justice. Embedding the notion of "climate justice" at the core of policy, media coverage and public opinion results in a "political frame around [Global South] risk and [Global North's] responsibility" (Boykoff, 2010). Such a narrative is diametrically opposed to the Global North's conceptions about economic growth, their viability as nation states and the cost of action they are largely expected to underwrite. These contrasting narratives are indicative of what Stone terms third order change, where policy diffusion results in divergence because contextual factors and wider societal forces also structures policy decisions. These factors include private interests, culture, and historical experiences.

Consistent with the nature of policy divergence, in key sections of the Global North, global climate "policy outcomes are the result of material self-interest, bargaining power, and the ability to strong-arm weaker states through more coercive forms of power" (Roberts and Parks, 2007, p. 5). As DeSombre (2000) contends, few nations can credibly threaten to not participate

or defect (bargaining power), particularly on an issue of existential import where risks are greatest in localities where capacity constraints (technological, monetary and technical) are often higher. Both Gruber (2000) and Martin (cited in Roberts and Parks, 2007) posit that the ability to change the status quo unilaterally and gainfully is limited to a select group of nations (wealthy, and in the Global North), that also has the ability to directly and indirectly (via networks) institute sanctions of various sort to influence the actions of other nations (coercive and non-coercive power).

In other words, the nature of the global climate change policy network constrains ambitious climate action by reinforcing power differentials and associated worldviews, beliefs and interests. The UN IPCC, for instance, by virtue of its dependence on agreement among states has had to balance politics with scientific consensus and has been heavily criticized for delaying its expression of certainty about the primary cause of climate change—anthropogenic activities. In balancing politics and scientific consensus, the intergovernmental entity is compelled to qualify its assertions of certainty through negotiation with states that give primacy to their economic self-interest and ideological dispositions in order to earn their approval for timely publications. The result is a degree of obfuscation that rids potentially powerful generative concepts such as "tipping points" of their potency for promoting self-efficacy (Russil and Nyssa, 2009). So, while the UN IPCC does not have the same obviously skewed dispensation of power as evident in the UN Security Council where five nations hold a veto on global matters, it is still subject to the broader challenges that undermine policy outcomes in seemingly egalitarian intergovernmental entities such as the UN General Assembly and the exercise of the Global North's soft power in diplomatic parlance or Ideological State Apparatuses, in Althussian terms.

The UNFCCC, which is a comprehensive articulation of the climate change challenge, what ought to be done and the global engagement process, constitutes the core of the global governance and policy framework. The Framework is widely regarded as strong for its focus on both adaptation and mitigation—the two ways in which climate change must be tackled—and notes the importance of effective communication, among other measures necessary for a comprehensive global response. However, the points of action noted by the UNFCCC require major investments and are necessitated to varying degrees by geography. In the latter case, much of the Global South advocates for adaptation measures to ensure that livelihoods are preserved amidst immediate and projected climate-induced changes that have both economic, social and environmental costs which they are unable to even remotely offset alone. Conversely, the Global North, by virtue of physical and psychological distance to immediate and projected impacts and the consequential (causative and preventative) role of their historical and contemporary economic model, often emphasizes mitigation.

Both approaches are critical as the UNFCCC contends, however, the limited influence of the Global South has meant that the mitigation discourse dominated the conversation and flow of resources. Internationally, the core of global development financing flows from entities such as the World Bank and the International Monetary Fund (IMF), which are chiefly guided by the motives of their dominant western shareholders and voting blocs. At a bilateral and third sector level, the flow of development resources is also structured by North-South flows. In some instances, countries, namely the United States, Canada and Australia prohibited funding development projects with an explicit climate change focus for ideological reasons (climate denialism) and economic self-interest (protection of oil and coal sectors). The substantial requirement for monetary resources to address climate change is therefore a dominant

determinant of power in the allocation of climate resources globally and consequently, the ability of countries to act effectively and timely. That this form of power is largely held and dispensed by the Global North means its bargaining power diminishes that of the states most directly affected by climate change. As noted earlier, some countries in the Global North have exercised coercive or repressive forms of power directly in the allocation of their development resources and indirectly through disproportionate influence over critical segments of the global climate change knowledge, policy and resource network. So, the differential materialization of policy diffusion and action in response to a challenge framed in existential terms and a clear delineation of risk and responsibility within a geo-political context marked by national wealth and power differentials has material consequences in the Global South.

However, the exercise of power and influence based on beliefs and worldviews has a degree of mobility, as multimodal cultural theory interpretive frameworks often demonstrate (Bellamy and Hulme, 2011). With respect to my object of study, this mobility is due to a range of factors, including strategic advocacy by varied interest groups and events that constitutes a tipping point that forces policymakers and influencers to rethink their course of action. In recent years, the Global South has advanced both a rational and moral position often framed as "climate justice," which is also reflected in the multilevel negotiation processes in positivist and livelihoods terms. This scientific and existential framing around risk and responsibility privileges robust climate financing, compensation for "loss and damage" and keen focus on adaptation efforts. Such advocacy, combined with major events (tipping points) such as Hurricane Sandy that devastated New York and New Jersey (major centres of power and influence in the Global North), has likely contributed to a shift in the Global North's disposition towards climate change.

Since COP 16 in Cancun, Mexico, the Global North agreed to fully equip the Green Climate Fund to the tune of US$100 Billion (Leslie, 2013). While a significant elevation of adaptation measures at the global level, the rules governing the fund still reflect the worldview and priorities of the Global North. This is most palpable in terms of the nature of the entities that have been certified to tap and utilize these resources: eight of the last 13 institutions to be accredited are development banks (national and intergovernmental actors) or investment funds (private actors) that operate in accordance with the priorities and Bretton Woods entities, that enforce neoliberal orthodoxy (Caribbean Climate, 2015). Consistent with the privileging of economistic frames at the expense of adaptation's justice implications noted in the theoretical outline, these institutions do not prioritize intangibles, including alternative livelihoods projects that are difficult to quantify and often take years to result in manifest changes along the narrow time horizons of development projects. The onerous conditionalities associated with these resources, including reporting procedures, also render them unattractive and may compel states to opt for commercial loans to install gray infrastructure such as sea walls, breakwaters, and other urgent mitigation projects (Negotiator A, personal communication, February 15, 2018).

So, while there has been a significant degree of mobility in the Global North's worldview with respect to broad climate change approaches, the ideological impetus that governs action remains relatively fixed and are varying fostering policy and action convergence through an established network (assemblage of apparatuses in Foucauldian terms) that have been naturalized as local or regional. The indigeneity invoked in the names of some apparatuses (often national and regional) powerfully reinforces this: African Development Bank, Asian Development Bank, Caribbean Development Bank, Development Bank of Trinidad and Tobago, Kenyan Development Bank, among others). Importantly, too, is the degree of commitment to

adaptation as the non-binding commitments to fully resource the global adaptation facilities have not materialized and the Global North often recycle broader development commitments to meet targets or strategically use climate financing to secure support from vulnerable states for other causes, which can fragment the frail South-South alliance on climate change (Negotiator A, personal communication, February 15, 2018).

Forging Community

It is within this context that the most vulnerable states in the Global South, the small island developing states of the Caribbean and the Pacific which are otherwise completely unlinked culturally, economically, politically or historically, first framed their negotiating thrust for global surface temperature rise to be limited to 1.5˚C. These regions contended that their future depended on "a binding and ambitious agreement" at COP 21. A bold agreement is understood to be one that curbs Greenhouse Gas (GHG) emissions to limit the global rise in temperature to as far below 1.5˚C as possible. This "is needed to safeguard our survival, food, critical industries such as tourism, infrastructure and promote renewable energy" (CCCCC, 2015). These existential demands implicitly indict the existing global climate change governance framework and gave rise to a trans-regional community in activist, political and technical terms.

The UNFCCC, whose ultimate objective is to limit emissions of GHG came into force in 1994 (two years after it was signed). Its Kyoto Protocol that sought to set emission reduction targets for developed countries only came into force in 2005 (nearly a decade after it was signed) and ultimately failed after Australia, the United States and Canada withdrew while much of the European Union missed their targets. Consequently, emissions of GHG continue to rise at great detriment to the world and small island and low-lying coastal states. The inaction associated with these early efforts continued in negotiation processes where the industrial world advocated

limiting global temperature rise to below 2˚C above preindustrial level, despite mounting evidence that if global warming is not contained to below 1.5˚C, the consequences for much of the developing world could be catastrophic.

The SIDS Campaign Platform

Recognizing the earlier limits of protocols such as Kyoto that only compelled a subset of nations to act, the SIDS thrust (campaign and negotiations) was conceptualized around this scientifically backed notion of 1.5˚C as a tipping point with existential consequences for SIDS. In leveraging the scientific and moral high ground, the regions demanded a new comprehensive agreement applicable to all, including the critical big emitting emerging economies of Brazil, India, China and the broader G20 group. While these demands were officially articulated through particularly confidential and secretive diplomatic and negotiating channels, they were mirrored by the PANOS Caribbean led independent campaign. "1.5˚C to Stay Alive," which is an optimal and highly accessible proxy for the interests of SIDS ahead of the Paris Conference.

The campaign included a public awareness thrust that highlighted the centrepiece of the region's negotiating position: keeping warming "as far below 1.5˚C as possible" (CCCCC, 2015). The existential "1.5˚C to Stay Alive" negotiating frame was reprised because of its high resonance within the policy and scientific interface since COP 15 in 2009, which spurred interest in launching a two-tiered campaign. At a general level, it sensitizes citizens across the respective regions about the existential implications of climate change, particularly its impact on livelihoods. At the global level, it was used to make a convincing case within the intergovernmental policy negotiating fora for the reduction of greenhouse gas (GHG) emissions as an effective means of stabilizing global warming (CARICOM Climate Change Centre, 2009). While a formal campaign only materialized on the cusp of the landmark COP 21 held in Paris,

France in 2015, ad hoc actions were previously implemented in accordance with the highly resonant theme and consistent use of the existential framing within the ongoing global negotiating processes since COP 15. It also did not result in the inclusion of the title demand to limit global temperature increase to 1.5˚C in the climate targets or pronouncements emerging from COP 15. On account of this, the ad hoc campaign's emancipatory potential was unrealized and the intransigent nature of international environmental politics, primarily the vast power differentials between small island states on one hand and large emerging economies and developed countries on the other, was cited as the main cause for the campaign's failure.

The COP 21 iteration of the campaign, which was spearheaded by Caribbean-based non-governmental organizations, is widely deemed to be successful and a critical tool in the SIDS's articulation of its interests. The campaign's success is routinely justified by its visibility—the campaign slogan became a dominant buzzword at the conference—and the policy traction it yielded. Its visibility is largely associated with its sprawling online platforms, including an informative though rudimentary website (www.1point5.info) and well-maintained social media pages (Facebook (1point5toStayAlive) and Twitter (@1point5OK)) that promoted negotiating positions and the region's climate challenges in its three official languages (English, Spanish and French). These platforms were central to the intended purpose of the online campaign, namely, supporting:

> a large coalition of journalists, artistes, writers, civil society organizations and members of the negotiation teams, united in a series of events and activities raising awareness on the issue. Production of a music video with regional artistes and performers, as well as a series of one-minute clips with individual regional celebrities

promoting the campaign and the message. Series of events such as a Day of Action on 1 November, 30 days to the opening of the Paris Conference (Lévesque, 2016, p. 2).

The high visibility of these purpose-built and launched platforms, primarily the website and Facebook, is underscored by the realization of substantial following in the narrow period spanning the campaign's launch and the end of the landmark conference. Google Analytics (see Table 7) shows the website attracted nearly 11,000 views between its October 23, 2015 launch and January 20, 2016 (Lévesque, 2016, p. 4). Similarly, Facebook's insight tool shows (see Table 8) that the combination of the campaign's varyingly launched multilingual pages (between October 6 and December 6) exceeded the targeted 5,000 followers in merely six weeks (December 6, 2015 to January 20, 2016) (Lévesque, 2016, p. 5). Twitter, which was less widely used, only attracted 180 followers in the same period.

Table 7: Campaign website visits in the three months spanning launch day and the aftermath of COP 21

Visits to Website	Monthly	Daily (average)	Pages (monthly)
October	2252	75	12129
November	3039	101	14373
December	4052	130	13982
January	1468	77	3511
Total	10811	-	43995

*October 23, 2015 to January 20, 2016

Table 8: Campaign followers between complete multilingual Facebook launch and conference aftermath.

Facebook followers	6 December	20 January
English page	4221	4289
French page	575	591
Spanish page	474	486
Total	5270	5366

Alongside didactic information about climate change and its impacts on the Caribbean and explaining the region's negotiating position, these platforms offered a daily round-up of climate change media coverage and a range of audiovisual content. Audiovisual content included a reggae and calypso theme song (the collaborative effort of several Caribbean acts) that

championed the key campaign theme. Relatedly, they featured awareness-raising activities, such as a Selfie Video Challenge and a flash mob. The campaign's prominent employment of a mixture of contemporary science, strategic partnerships (such as the high ambition coalition), cultural tropes (such as music and visuals), new communication tools and nuanced advocacy allowed it to bridge ideological divides rhetorically, but not functionally or procedurally where it matters most.

However, the efficacy of the campaign must account for the totality of the platform rather than solely the key demand featured in its title. The "1.5˚C to Stay Alive" campaign also included 10 other features that are often missing from much of the analysis about the widely proclaimed success of the campaign (see Figure 1). The other campaign demands articulated by the negotiators from the Caribbean and Pacific are that: 1) the agreement should be in the form of a protocol to the UNFCCC applicable to all Parties; 2) the agreement should address adaptation, mitigation, loss and damage, finance (nominal support), technology and capacity building; 3) loss and damage (compensation) should be treated separate and apart from adaptation; 4) mitigation commitment cycles should be of five-year durations with ex-ante and ex-post reviews to ensure that each commitment cycle responds to the latest climate science rather than being locked into long cycles; 5) provisions be included to address the specific needs and special circumstances of SIDS; 6) enhanced provisions for supporting the adaptation needs of vulnerable developing countries be included; 7) developed countries provide adequate, predictable and new resources to boost climate finance; 8) capacity building, technology development and transfer in SIDS be prioritized; 9) there must be provisions for measuring, reporting and verifying performance on commitments; and 10) a compliance regime must be instituted (CCCCC, 2015).

Figure 1: Brochure Part A showing the Caribbean's official negotiating position for the Paris Agreement.

How important is COP 21?

Caribbean Community Climate Change Centre

2015 is shaping up to be a landmark year for global action on Climate Change. The future of the world, particularly the Caribbean, depends on a binding and ambitious global agreement at COP 21.

A bold agreement that curbs Greenhouse Gas (GhG) emissions to limit the global rise in temperature to below 2° C is needed to safeguard our survival, food, critical industries such as tourism, infrastructure and promote renewable energy.

Why is a bold agreement necessary?

The United Nations Framework Convention on Climate Change (UNFCCC), whose ultimate objective is to limit the emissions of Greenhouse Gasses (GhG) into the atmosphere was signed in 1992 and came into force in 1994. Its Kyoto Protocol (KP), which set emission reduction targets for developed countries was adopted in 1997 and came into force in 2005. Yet, the emissions of these gasses continue to rise at great detriment to the world, particularly Small Island low lying coastal developing states such as those that make up the Caribbean Community (CARICOM). While the industrial world is advocating limiting global temperature rise to below 2°C above the preindustrial level, there is mounting evidence that if global warming is not contained to below 1.5° C, the consequences for the Caribbean could be catastrophic. The window of opportunity to limit emissions of these global warming gases is closing rapidly. Emissions must peak and stabilize rapidly if the 1.5 target can be achieved. So the objective of COP 21, which will be convened in Paris in December 2015, is to finalize a new comprehensive Climate Change agreement applicable to all Parties to the UNFCCC which will come into effect in 2020.

Figure 1: Brochure Part B showing the Caribbean's official negotiating position for the Paris Agreement.

Critical Reflection: Campaign Platform and the Paris Agreement

Table 9: The representation and ranking of campaign goals (Section A) and thematic focus (Section B) in the Paris Agreement

SECTION A				SECTION B		
Code	**Code Total**	**Goal Total**	**Goal Rank**	**Category**	**Total**	**Rank**
Goal One				Verification	9	A
Protocol			6			
Optional - 1	1	2				
Unqualified - 1	1					
Goal Two				Adaptation	7	B
Adaptation			2			
Capacity Building						
Technology				Compliance	6	C
Unqualified - 2	11	11				
Goal Three				Finance	5	D
Loss and Damage			6			
Modified - 3	1	2				
Optional - 3	1					
Goal Four				Mitigation	4	E
Mitigation			10			
Modified - 4	1	1				
Goal Five				Monitoring	4	E
Monitoring			10			
Verification						
Unqualified - 5	1	1				
Goal Six				Capacity Building	4	E
SIDS			5			
Modified - 6	1	3				
Optional - 6	2					
Goal Seven				Technology	4	E
Frontiers			3			
Modified - 7	7	7				
Goal Eight				Protocol	3	I
Finance			6			
Modified - 8	1	2				
Optional - 8	1					

Goal Nine						
SIDS			6	SIDS	3	I
Optional - 9	2	2				
Goal Ten						
Monitoring			1	Frontiers	2	K
Verification						
Modified - 10	5	12				
Unqualified - 10	7					
Goal Eleven						
Compliance			4	Loss and Damage	1	L
Protocol						
Modified - 11	2	6				
Optional - 11	3					
Unqualified – 11	1					

A substantial evaluation of the pronouncements about the success of the campaign hinges on how these demands feature in the Paris Agreement. Close reading of the Paris Agreement, in conjunction with the 1.5˚C to Stay Alive campaign (both the general audience thrust and the official negotiating positions), reveals that the Agreement addresses all the priorities of the SIDS in some form (see Table 9). Emblematically, goal two, which signals six areas of focus that ought to be accorded central attention by the Agreement, is the second ranked goal in terms of prevalence and is only marginally outpaced by goal 10 (11 and 12, respectively). Furthermore, each of the discrete areas highlighted by the campaign for special attention are accorded heightened (in terms of rank, a measure of focus) and comparable attention, except the crucial issue of loss and damage, which is the least grounded category in the Agreement with prevalence of one (see Table 9 - Section B). Specifically, Adaptation and Finance have prevalence of seven and five, respectively, with ranks of B and D on a scale of A to L (highest to lowest), whereas mitigation, monitoring, capacity building and technology are ranked next (E) with equal prevalence of four each.

Section A of Table 9 shows the numerical ranking of each of the 11 goals outlined by the campaign and the nature of the goal's inclusion (unqualified, modified and/or optional), alongside the categories or areas of focus emphasized by each goal. Specifically, goals 10, two, seven and 11 are the most grounded in the Agreement. These top four ranked campaign demands register at least twice the next highest ranked goal (goal six with prevalence of three). Goals one, three, eight and nine are ranked sixth with equal prevalence of two, while goals four and five are ranked last (10th) with equal prevalence of one each.

However, the nature of their inclusion varies substantially. Only goals one, two, five, 10 and 11 have elements that are included in the Agreement. As established, earlier, goal two which itemizes the scope of the Agreement the campaign envisioned, is entirely accounted for. Alongside goal five, which covers monitoring and verification, these are the only campaign goals to be accorded totally unqualified inclusion. While goal 10, which also covers issues of monitoring and verification, is accorded highest attention by the Agreement (first ranked goal) and the 12 elements relevant to its inclusion are primarily unqualified (seven of 12), more than 40 percent of it is modified and substantially subject to variable interpretation by signatories. Relatedly, goal 11, which covers issues of compliance, is included (unqualified), the mechanism is both modified (two of six) and primarily optional (three of six). This is in concert with the unqualified but optional inclusion of goal one, which advocates for the Agreement to be in the form of a binding protocol to the UNFCCC as a means of instituting an enforceable compliance mechanism.

On the other hand, goals eight, six and three, which address issues pertaining to finance, SIDS and loss and damage, respectively, have been included as modified and optional components in equal measure, except goal six which is primarily optional (two of three

elements), whereas, goals seven and four, which address issues relevant to frontiers (developing countries in general) and mitigation, respectively, have been included in modified form. Goal nine, which addressed the special circumstances of SIDS, is entirely optional.

Consistent with the fact that thematic or categorical focus transcends campaign goals because some goals reflect multiple areas of focus, Table 9 - Section B shows the descending alphabetical rank (A to L) of each category based on its prevalence in the Agreement. Verification, Adaptation, Compliance and Finance are the categories of issues accorded greatest attention by the Agreement with descending ranking of A to D. Considered alongside earlier observation of the identical and relatively high ranking (E) accorded to mitigation, monitoring, capacity building and technology, the data foregrounds the distinctly low level of emphasis accorded to issues of loss and damage and the frontiers (developing countries in general), per goals three and seven, respectively, which rank last (L) and penultimately (K). Issues emphasized by goal one (protocol), six and nine (SIDS) are also accorded relatively low priority with equal ranking (I).

While the discursive rubric used to generate Table 9 attends to all campaign goals and categories, campaign demand numbers one, four, eight and 11 constitute the campaign's core. Specifically, without elements one, eight and 11, the existential motivation for 1.5 ˚C to Stay Alive cannot be realized (four). Demand four, which emblematically features in the title of the campaign and the framing of the 11 goals (see Figure 1), constitutes a critical threshold beyond which climate change-induced outcomes will be catastrophic and irrevocable, whereas demand eight calls for a specified climate-financing regime, without which none of the commitments can be realized. Both demands one (call for a protocol) and eight (compliance) call for systems to ensure the realization of all demands, especially the two other core elements (Leslie, 2013).

Accordingly, it is instructive to further probe the nature of the inclusion of the campaign goals, with emphasis on the core.

With respect to the key demand on how to orient mitigation ambition (goal four), the Agreement opted for between 1.5˚C and 2˚C rather than the "as far below 1.5˚C as possible" (CCCCC, 2015) needed to preserve the existence of SIDS. Per Article 2 of the Paris Agreement, the decisions taken to tackle climate change, which have been deemed relatively ambitious by commentators, are based on voluntary national commitments known officially as Intended Nationally Determined Contributions (INDCS). This crucial section of the Agreement notes that the INDCS do not even remotely meet the Global North's preferred "least-cost scenarios" associated with a 2˚C increase in global average temperature.

In practical terms, the key demand of the campaign is therefore unmatched by the INDCS, which comprehensive action hinges on, even as the clear majority have been submitted. This is a fundamental indication of how deeply the key 1.5˚C demand has been rebuffed. A closer look at the crafty semantics used to acknowledge this demand illuminates this assertion, particularly Articles 17 and 21. In Article 17, where the farfetched possibility of the least cost scenario associated with 2˚C is cited as a by-product of conservative voluntary national commitments, the Agreement calls for emissions to be reduced to 40 gigatonnes to realize the 2˚C mark. It continues by adding 1.5˚C as a secondary option, thus creating a range and notes the undetermined level of emissions reductions necessary to attain 1.5˚C, the upper limit of the key demand by the SIDS campaign. The Paris Agreement uses Article 21 to invite the IPCC, a key pillar of the global climate governance architecture, to prepare a report within three years "on the impacts of global warming of 1.5˚C above preindustrial levels and related greenhouse gas emission pathways" (p. 4, 2016), which can further inform adjustments to the voluntary national

emissions reduction targets. This is a clear effort to appease proponents of the climate justice narrative amidst mounting evidence that the will to realize a target below 1.5˚C is non-existent. Curiously, SIDS have pointed to this "special report" slated for publication in 2018 in their declaration of victory as an important concession.

It is important to probe this further by looking at the framing of 1.5˚C in the Agreement. It is presented as desirable, but not practical and subject to further quantification as well as the same voluntary process. This concession is suggestive of tokenism. Specifically, the worst-case scenario articulated by the campaign is deemed the best-case scenario in the Agreement. I posit this assertion as the precise negotiating demand was for global average temperature rise to be held to "as far below 1.5˚C as possible." On this basis, it is reasonable to argue that the campaign's key demand gained traction, but it does not constitute a victory. In fact, it is dubious to claim a modicum of victory on this basis where the key demand is effectively rejected based on projected INDCs and broader scenarios outlined in Article 17.

The campaign's key demand is not the only under-realized negotiating position. SIDS stoutly demanded that the Agreement is crafted as a protocol, a legally binding agreement, associated with the UNFCCC (goal one). While the Agreement is adopted under the auspices of the UNFCCC, it is not legally binding and lacks enforcement mechanisms. The rejection of this key demand is primarily because of adamant opposition from both India and the United States (Negotiator A, personal communication, February 15, 2018). The basis on which both countries rejected the notion of a protocol is illustrative of the centrality of beliefs and worldviews to my reading of international climate change politics and the exercise of power. In the case of the United States, where the executive is headed by a President who favours bold action, a binding agreement would be stoutly rejected by a legislature (Congress) in which the balance of power is

held by Republicans who oppose this approach for a myriad of reasons. Namely, a rejection of mainstream climate science (ideological), the defence of sectors that bankroll their campaigns and provide substantial investments and employment to their constituents or country (self-interest) and deep suspicion of multilateralism, which is believed to undermine American prestige and competitiveness (ideology).

The lack of a protocol is consequential. The Paris Agreement, as I have posited, is based on voluntary commitments with no sanction mechanism. So, while the call from SIDS for a transparent reporting framework and a facilitative compliance regime are evident in the Agreement, the lack of enforcement mechanisms could undermine their effectiveness. These foundational fissures deeply undermine the potency of the Agreement from the vantage point of the SIDS. They also constitute a trend of both linguistic and procedural ambiguity in the Agreement relative to the negotiating positions held by the SIDS. In a bid to ensure INDCS are subject to the latest science and undermine climate denialism, SIDS called for mitigation commitment cycles that are in sync with IPCC reports. However, the Agreement calls upon "the Parties" to review their commitments in 2020 and every five years thereafter with no clear directive to adhere to the IPCC's findings. This linguistic ambiguity has manifest consequences in procedural terms and the extent to which livelihoods can be safeguarded through effective global action.

The ambiguity is also evident even in instances where the campaign more convincingly claims success. Though the Agreement reflects the call for support—financial, technical, capacity building etc., per goals two, six, seven and eight—to be made available to the most vulnerable, there is no clear delineation of "who" and what constitutes that category. This is an important consideration as the existing global rubric for vulnerability in development contexts

primarily uses Gross Domestic Product. This measure of progress marks most Caribbean SIDS as middle income, which precludes them from tapping generous debt relief and broader development support (Goff, 2003). Importantly, vulnerability could be established in terms that could include wealthy countries that are nominally part of the Global North, such as Japan, The Netherlands, Australia and New Zealand, who have had widely reported climate-induced losses (Negotiator A, personal communication, February 15, 2018). This conception could contribute to the unmooring of the impetus for the imagined community of SIDS that gave rise to the vigorous campaign under examination.

Notwithstanding the chequered set of outcomes relative to the demands of the campaign, I earnestly question the veracity of the claim of success upon closer inspection of three critical aspects of the agreement articulated by the campaign: climate finance, loss and damage and technology transfer, alongside the campaign's banner call for global temperature rise to be limited to a maximum 1.5˚C, the core of the 11-point position outlined by the SIDS. As I posited earlier, the Agreement implies that warming will be limited to between 1.5˚C and 2˚C, and not "as far below 1.5˚C as possible," alongside clear evidence that even 2˚C might be unattainable under the current regime. Of the campaign's core, climate finance is perhaps the most critical as it determines the extent to which SIDS will have access to resources to adapt to climate change. The Agreement acknowledges the campaign's call for new and substantial streams of finance by setting the low threshold of $100 Billion per year for the world, a mere 0.13 percent of the nominal global economy (International Monetary Fund, 2015). However, the non-binding regime also means this commitment is no different from other international aid pledges that fail to materialize or are articulated using a myriad of accounting procedures that obfuscates actual cash flow for real work. This shortcoming in the Agreement is also evident in its failure to describe

the nature of the financing: how much of it will include concessionary loans, grants and capacity building?

Notwithstanding, I note the continuation of a pattern of partial victories with the crucial climate finance indicator. This is in part because climate finance rhetoric fits the preferred ideological approach of the Global North, whereas loss and damage, the most seminal climate justice demand, does not (Agyeman, Doppelt, Lynn, & Hatic, 2007; Gardiner, 2011). Loss and damage compels the Global North to compensate countries for climate change induced damage, such as the disappearance of barrier reefs, islands, infrastructure and livelihoods. While this notion (goal two) is included in the Agreement, the nature of its inclusion is antithetical to the spirit of the manifestly political nature of the reparatory climate justice impetus that underpins the concept. Emblematically, Article 52 states, "the Agreement does not involve or provide a basis for any liability or compensation" (Paris Agreement, 2015, p. 8). This position is another manifestation of the Global North's coercive (repressive) and ideological power in international climate policy. The thrust of any credible agreement rests on its support, particularly because of its financial clout, which is needed to fund effective action. Its ideological disposition around capital and finance, intellectual property rights and climate justice guides the exercise of that power.

The ideological undercurrents related to capital and climate justice are most notable. Singling out regions of vulnerability and prioritizing their needs is inevitable from a climate justice perspective, but diametrically opposed to the capitalist logic that underpins engagement and global policy processes. In this sense, the principles of engagement enforced in global trade are being mapped onto the climate scene in that common rules are preferred (convergence through harmonization). In large part, this is because climate risks are viewed as a by-product of

economic activity (past and current) and an opportunity to spur a new economy that will revitalize growth. Preferential treatment in this context, though a product of vulnerabilities induced by the Global North because of its development model (Garnaut, 2008; Pelling, 2011), violates the economic logic that drives the Global North's new-found urgency to act: capitalism in the form of the 'green or blue economy.' Conceived in a more historically sensitive manner, SIDS have not won any special treatment to address their existential climate change-induced challenges in much the same way they have lost preferential trade positions with the European Union because of prior exploitative economic and social arrangements. In the latter instance, it was global governing ideological apparatuses, namely the World Trade Organization, that thwarted that arrangement at the behest of North American corporate agricultural interests (Grynberg, 1998).

The ideological undertones, particularly economic self-interest, that thwarted the core of the existential demands made by SIDS are deeply pronounced in the Paris Agreement. The modified inclusion of technology transfer (goals two and seven) as a non-binding recommendation is tantamount to the Global North abstaining on a critical adaptation and mitigation mechanism. Greater non-market technology transfer (renewable energy, climate smart agriculture techniques and infrastructure) would enable SIDS to adapt amidst a changing and variable climate by reorienting their beleaguered economies by reducing energy cost and boosting competitiveness. This is a fundamental point of contention as technology transfer would undermine the green economy thrust that Europe, North America and emerging market giants are actively investing in to reorient their economic futures amidst clear signs that a transition from fossil fuel is inevitable. Uncontrolled early-stage and non-market technology transfer would therefore undermine the key principle that drives action (and inaction) on climate change today:

deep territorial and national concerns about economic competitiveness. In tandem, it also undermines capitalist notions about the sanctity of intellectual property rights, which are intended to ensure maximum return on inventions and/or ownership of rights (Benkler, 2006).

The centrality of ideology and beliefs in determining global climate change policy outcomes within the existing structures is therefore a primary reason the campaign merely achieved the series of partial victories I have discerned. By critically examining each of the campaign's key demands as reflected in the Paris Agreement, I have detailed how the global climate change governance structures function as avenues for the articulation of the Global North's interests. Within these structures, I have noted the dispensation of the unequal distribution of power between the Global North and South—specifically, how the Global North's vast advantages (monetary, technological and its emission levels that renders it both the main cause of the problem and a prime change agent) are used to defend its economic interests and ideological disposition about climate science and approaches to effective action. In exercising these positions through the global climate change governance structures that are largely funded by its resources, the Global North ensured the process yielded tepid outcomes that are largely framed as landmarks in the press and by campaign proponents.

The rejection or partial accommodation of the core demands of the climate justice movement—limiting global warming to as far below 1.5˚C as possible (goal four), a robust climate finance regime attuned to the needs of SIDS, LDCs and other vulnerable states (goals six, seven, eight and nine) and a compensation regime for loss and damage and technology transfer (goals goal three, seven and nine)—underscore that the dominant impetus for climate action is primarily conservative and economistic in orientation. This dominant impetus for action is counter to climate justice, the narrative championed by the campaign.

Given this context, the partial successes noted must be scrutinized to determine what factors accounted for them. My analysis of the Paris Agreement and critical reading of the SIDS's campaign shows that all areas mentioned by the campaign are reflected in the final document. However, the nature of their inclusion renders this an insufficient basis on which to claim success or influence. Rather, it reflects SIDS's expertise in climate science and policy. The constrained way the goals articulated by SIDSs are included speaks to the limited influence held by the SIDS bloc. This limited influence is even more palpable when one accounts for the broader environment in which it was exercised and the structure of the actions in support of the campaign. The campaign held the scientific and moral high ground in articulating an existential concern (IPCC, 2014) and sought to leverage unprecedented global public support and consensus in climate science, as well as the clout of the improbably named "high ambition coalition."

Whereas the public audience thrust led by PANOS Caribbean was launched a mere two months ahead of the Conference, the coalition emerged independently at the level of the political and diplomatic directorate. It was formed covertly by the European Union, alongside 79 countries from Africa, the Caribbean and the Pacific blocs, six months before the Paris Conference to push for an "ambitious, durable and legally binding" deal with strong reviews every five years (Negotiator B, personal communication, February 2, 2018). The coalition, which was unveiled at a crucial point in the negotiation process, was later joined by Canada, the United States and Norway. The bloc of countries embraced the campaign call for "strong recognition of the below 1.5-degree temperature goal, a clear pathway for a low-carbon future, five-yearly updates and a strong package of support for developing countries" (McGrath, 2015, para. 8).

However, the lack of coordination at the technical level, where the specifics of the 1.5˚C target is determined, indicates the hobbled nature of a coalition of disparate interests (Negotiator

B, personal communication, February 2, 2018). Winning the support of a wide and powerful bloc of countries, such as the High Ambition Coalition, is crucial for the advancement of the campaign's mission considering the power deficit. It constitutes a key bridging principle employed by the diplomatic and political directorate across SIDS to advance their interests that likely contributed to the key demands being featured in the Agreement in some fashion. While it predates the launch of the campaign, the expansion of the coalition is also an inevitable response to the moral and scientific high ground occupied by the SIDS efforts aligned with the campaign goals and the popular public support generated and leveraged by the general audience pop-culture thrust enacted by PANOS Caribbean. This combination of factors necessitated decisive public overtures by the Global North, especially as its own scientific, fairness and participatory developmentalist rhetoric was marshalled against it in a convincing manner that resonated with the global public. This complemented the SIDS's need for alliances with powerful nations to boost their cause. This constitutes a significant strategic positive for the campaign. However, the operationalization of the coalition was invariably hobbled by similar degrees of challenges I have pointed to in the broader global structures. These challenges are due to unequal power, ideology, worldviews and beliefs. The near total political nature of the coalition's engagement, to the exclusion of common technical positions and its independent functioning from the general audience thrust, are manifestations of these factors. The disparate nature of the countries cobbled together underscores these observations.

The technical and political coordination fissures at the global level are also evident in the campaign's interaction with populations most emblematic of the risks and cause that it championed. The belated emergence of the general audience thrust, the campaign's overall technocratic general audience framing, and execution resulted in a lack of resonance among the

most vulnerable. Of the 300 people sampled for this project across 17 indigenous and traditional villages in Fiji, India and Belize, which exemplifies the campaign's climate justice impetus, none were aware of the popular social media campaign and related negotiating thrust. Furthermore, even the name of the bi-annual confab (COP 21) for which public support was being mobilized by the campaign is unrecognized. Both the full name, Conference of the Parties and acronym, COP, were unrecognized by respondents in all contexts, except Fiji where there is maximal recognition. However, this is not associated with the campaign. It is entirely attributable to the fact that Fiji held the presidency of COP 22 at the time of the study and funded a significant media campaign championing the prestige the role accorded the island nation. This campaign is explicitly cited by most respondents.

Lessons

Notwithstanding the deeply qualified pattern of successes I have outlined, there are lessons evident from the process that are instructive for future climate justice efforts. As laid bare by the palpable absence of the campaign's resonance among populations most representative of the cause championed, there is need for more concerted engagement beyond cosmopolitan spaces with substantial new media connectivity. While the global negotiating process functions on a different narrative terrain from lay perceptions and understanding of climate change, more concerted and broad-based engagement with vulnerable populations is likely to generate a broader base of public support for a campaign and reinforce its credibility and authenticity for the pursuit of political change. Additionally, campaigns with a broader base of engagement in contexts of relevance are likely to generate transversal pressures on, across and within a multiplicity of sectors and networks that can influence decision-making processes and priorities varyingly across geo-political localities based on responsiveness to democratic forces, capital

and varied interest groups. In other words, even where a campaign gives primacy to political change in articulating existential claims, the multidimensionality of a phenomenon such as climate change (socially, politically, economically and ecologically) and the linked nature of spheres of power (business, politics and citizenry) warrants an expansive view of communication and its indirect impact across spheres.

Specifically, the partially successful advocacy of the Global South at COP 21 indicates that communication's emancipatory role does not completely reach its limit in domains of power at the global level where negotiations often privilege economics. In fact, it plays a definitive role in harnessing mounting global public pressure, scientific knowledge, diplomatic processes, economic modelling and the moral high ground to forge new relationships such as the high ambition coalition. The campaign is therefore revelatory about the role of communication and its utility in the domain of power and that moderate degrees of successes can be realized even amidst intractable politics. This is an important observation as the emergent literature on climate change communication is primarily concerned with general audience appeals.

However, the belated nature of the campaign and a lack of coordination between the supporting elements (public communication, negotiation and diplomatic) or related facets at the technical, political and general audience campaign level undermined the cohesiveness and efficacy of the overall campaign. In fact, these structural deficiencies mark the campaign as an exemplar of a missed opportunity to fully mobilize communication's expansive role and power in enabling change in technical domains (especially the policy and political), as espoused in dialogical and participatory communicative paradigms. The consequential nature of the lack of coordination is also likely a product of the distinction in narrative terrains across technical, political and general audience levels. The belated launch of the campaign, a mere two months

prior to the conference, four months after the discrete political and diplomatic machinations and several years after the technical exchange machinations, also clarifies the continued primacy of the techno-scientific approach to climate change policy-making. It also foregrounds the add-on or instrumentalist ends to which communicative efforts are proscribed. As observed in this study's review of the extant literature and theoretical outline, much of the valiant global response to global environmental change over the past quarter century has focused on the generation of scientific information on technical aspects of climate change and its impacts. However, the partial successes and resonance of the ambitious but structurally undermined campaign strongly indicates scope for a more expansive and central role for climate change communication activities. Specifically, climate change campaigns are likely to be more efficacious and robust when crafted alongside political and technical strategies and launched alongside or ahead of and in support of technical and political engagements. As the belated launch of the communicative thrust in support of 1.5˚C to Stay Alive strikingly shows, it was neither envisioned nor privileged as a strategic function with agenda setting potential at the outset.

Conclusion

This examination of the widely proclaimed success of the strategic 1.5˚C to Stay Alive campaign underscores the salience of coercive and soft power in international environmental discourse, policy formulation and diffusion across networks, as well as the importance of strategically navigating ideology in negotiations. Based on critical comparative analysis, the chapter contends that though the spirit of all campaign demands is reflected in the Paris Agreement, the manner in which they are featured considerably undermines the emancipatory potential of the campaign and does not portend well for the existential risks articulated. This is most evidenced by the non-binding nature of the agreement and the use of the upper limit of the

campaign's tipping point marker (1.5˚C) as the best-case scenario. This litany of partial and consequential successes achieved is a product of the intractable political context within which they are negotiated. In this context, fundamentally powerful national blocks privilege economistic and conservative beliefs, worldviews and self-interest at the expense of weaker states's existential needs. So potent is this environment that a highly strategic campaign that captures the global public mood, contemporary scientific consensus and diplomatic, technical and political alliances, such as the High Ambition Coalition, could only eke out moderate victories.

The campaign's success was also undermined by structural deficiencies, namely the ad hoc execution of various crucial supporting facets of action (political, technical and communicative). Strikingly, communication was conceived in such a narrow, instrumentalist and ad hoc fashion that the public engagement element only emerged belatedly (two months before the conference) and functioned as an 'add-on' that was tangentially managed by PANOS Caribbean, a third sector entity.

However, the partial successes realized by the structurally constrained multi-level campaign indicate that communication's effectiveness can transcend individual and societal boundaries and enable degrees of change in the political domain, which is instructive for future climate justice efforts. Specifically, communication should be viewed expansively, crafted at the outset and enacted alongside broader strategic, technical and political actions. The campaign's lack of resonance among populations most emblematic of the existential cause it championed also clarifies a critical gap in enabling communicative power and influence in technical and policy spheres through transversal network mobilization. Relatedly, it raises fundamental questions about the disconnect between the global and the local at the core of efforts to address a

challenge that necessitates bold and locally situated actions that are contingent upon globally defining and structuring policy decisions, which governs the distribution of critical adaptation resources (technical, financial, technological, among others) and the scale of mitigative action. It also clarifies fissures in the extent to which the most vulnerable are engaged and a need to explore how to do so effectively in order to mobilize critical support for global actions and, most importantly, enable efficacious local action. Accordingly, the subsequent chapters delve into the quotidian of life on the frontiers of climate vulnerability and impact to identify ways of optimizing agency boosting communication and engagement modalities.

Chapter Six: Fijian Case

The multi-island nation of Fiji is much like the world's other 42 Small Island Developing and Low-lying Coastal States (SIDS) physically, geographically and socio-economically. These distinct features, varyingly bestowed by nature and produced by culture and history, predispose Fiji, a set of 300 small islands in the middle of the world's largest ocean, the Pacific, and the Pacific Ring of Fire, highly vulnerable to climate change impacts. This vulnerability is compounded by economic constraints, the settlement of more than 90 percent of its population (approximately 800,000) along the coast, where the bulk of all services, infrastructure and commerce, including the critical tourism industry, are also situated. These frailties render Fiji and other SIDS unable to effectively anticipate and manage current climate impacts, even as the devastating effects on critical coastal sectors (natural and built) and livelihoods (tourism, fisheries and agriculture) manifest in a variety of ways. These include sea-level rise, which is associated with "coastal erosion and coastal inundation, increased exposure to wave action (as coral growth lags behind sea-level rise) and, in some cases, the retreat of mangroves" (Masilomani, 2013, p. 1).

In the absence of effective local and global action, the direct and indirect consequences of projected average global temperature increase above 2°C, when Fiji's social, environmental and economic systems are already stressed and struggling to meet the current impacts of climate variability and anthropogenic climate change, are of devastating existential proportions. However, at the level of the quotidian, there is much underway to tackle these existential challenges that engender and sustain the topic of hope, particularly the radical and action-oriented readings of hope offered by Lear (2006), McIntosh (2008) and Orr (2011), rather than the seemingly immutable limits of practical political reality. This action-oriented optimism is

underscored by indigenous scholar-practitioner Joeli Veitayaki's (2002) contention that Pacific Islanders have vast experience, "traditional knowledge and wisdom that can be the basis of response and adaptation policies, strategies and actions to address climate change and sea-level rise issues" (p. 2). So, given the complex nature of the problem under investigation, the centrality of context and culture in structuring vulnerability, adaptive capacity, perception and action, as well as their interrelatedness (Leichenko & O'Brien, 2000; Paavola, 2006; Pelling, 2011; Wisner et al., 2004), this case—one of three country-level analyses—examines the efficacy of three distinct climate change adaptation initiatives across six villages on three different Fijian islands (see Table F12; Appendix Countries-Projects-Villages for all projects across the three field countries) to ascertain how and under what conditions climate change adaptation is effectively communicated.

Methodologically, the case is predicated on qualitative analysis, including textual examination of project documents associated with the three climate change initiatives underway in my study sites, including communication aimed at my units of analysis during the project, extensive participant observation, several site visits to project installations, as well as 13 semi-structured focus groups and six semi-structured individual interviews that were conducted over a three-month period under immersive conditions. As detailed in the methodology chapter, both focus groups and individual interviews were conducted using a common set of guiding questions (See Appendix O). These direct engagements with the study population yielded a sample population of 105 (see Table 10) drawn from the six field sites (see Appendix E for village-level sample profile and data for each subset).

Table 10: The Fijian sample profile based on the adult population and households across field sites.

Fiji	Adult Pop.	Sample of Adult Pop.	Households in Field Sites	Households Sampled	Men	Women	Focus Groups	Individual Interviews	Youth
Total	498	105	196	126	56	49	13	6	33
	Rate	21%	64%		53%	47%			31%

While the sample size is moderate at only a fifth of the total adult population in the combined field sites, its representativeness is buttressed by a high degree of household representative (64%) and comparable levels of engagement across genders, and significant age youth representation. Structurally, the case is formatted in accordance with an integrated typology that combines the two elements (transcript and project codes) of the thematic logic order (see Table 11), a non-random procedure devised to analyze project and interview data and identify the decision-making processes that underpin climate action and inaction at the village level However, the analytical units gender and traditional practices function as cross-cutting and interpretive factors, respectively, alongside broader macro-group considerations such as age and ethnicity, where applicable. As outlined under paradigmatic considerations in the methodology chapter, this is consistent with Gladwin's (1980) study of non-adoption of agronomic recommendations. All codes and themes are defined in Appendix A.

Table 11: The integration of the thematic logic order to inform case structure

	Thematic Logic Order for Non-Random Data Analysis	**Integrated Thematic Logic Order**
	Transcripts	**Case Structure**
	Climate Action	Project (Type and) Framework
	Knowledge	Project Activities
	Climate Knowledge Acquisition	Project Action and Causes Profiled
1.	Signs/Indicators	Belief Progression
	Cause and Proximity	Project Outcomes
2.	Climate Risk	Project Perception
3.	Climate Agency	Personal Inclusion and Influence
4.	Motive for Action	Knowledge
5.	Climate Leadership	Climate Knowledge Acquisition
6.	Project Perception	Signs/Indicators
7.	Personal Inclusion/Influence	Climate Action
8.	Belief Progression	Cause and Proximity
9.	Angst	Climate Risk
10.	Traditional Practices	Climate Agency
11.	Gender	Motive for Action
12.	Schooling	Climate Leadership
13.	**Project Documents**	Angst
	Project Framework	
	Project Activities	**Cross-Cutting**
	Project Action and Causes Profiled	Gender
	Project Outcomes	Traditional Practices

Table 12: The climate interventions with their associated discrete and combined field sites, implementers and funders

Project Name	Implementer	Funder	Village	Subset
The Vanouso Tikina Project	ICA Prof. Joeli Veitayaki	Assorted & Local	Malawai	Gau Island
The Vanouso Tikina Project	ICA Prof. Joeli Veitayaki	Assorted & Local	Lamiti	Gau Island
Coastal Community Adaptation Project (C-CAP)	PaCE-SD	United States Agency for International Development (USAID)	Yaqaga	Yaqaga Island
European Union Global Climate Change Alliance (EU-GCCA)	PaCE-SD	European Union	Navai	Seaqaqa
European Union Global Climate Change Alliance (EU-GCCA)	PaCE-SD	European Union	Navundi	Seaqaqa
European Union Global Climate Change Alliance (EU-GCCA)	PaCE-SD	European Union	Rokosalase	Seaqaqa

Although PaCE-SD implemented two (EU-GCCA Project in Seaqaqa and the USAID C-CAP on Yaqaga) of the three climate change initiatives (Vanuaso Tikina on Gau) associated with the study populations in this case, all three are distinct in scope, sectoral focus, programmatic design and implementation.

The Vanuaso Tikina Project – Gau Island

The Vanuaso Tikina Project is a comprehensive ecosystems-based climate change adaptation intervention underway across 16 villages on Gau Island. Conceptually, it is predicated on the notion that resource management is about people, a formulation that privileges the view that improving the health of ecosystems promotes ecosystems services and enables human well-being. So, rather than pursuing clearly articulated and discrete goals, this locally driven initiative that started as a pilot in 2001 seeks to empower local people to "preserve their relatively pristine environment as the basis of their development" (Veitayaki, 2007, para. 3). The endogenous ethos of the project is evident from its explicit emphasis on offering ideational enhancement (knowledge and understanding of how to use it) and skills building to support the villages only after they have collectively determined their own plans that evolve across time. The soft guidance offered by way of regular follow-up visits to individual villages to validate their resource management plans and development activities, and the provision of trainings based on emergent community objectives are particularly emblematic of the project's endogenous ethos.

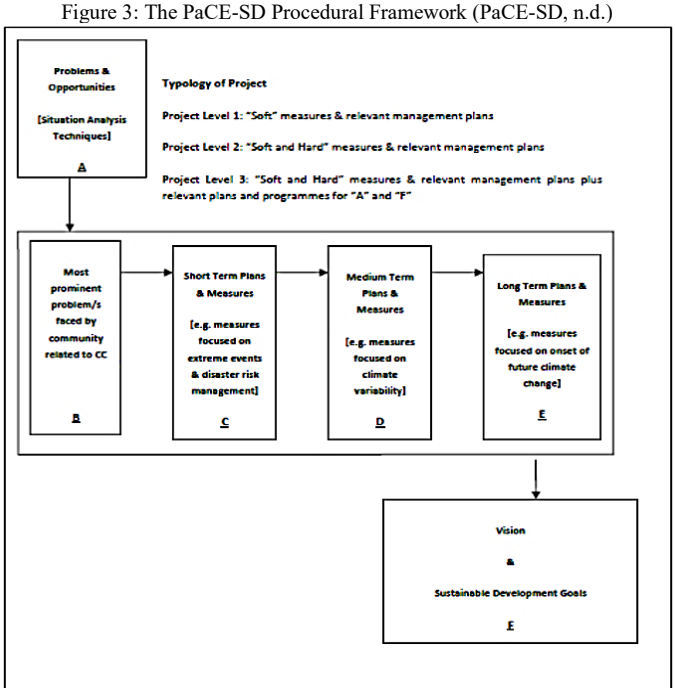
Although community objectives were determined based on "externally driven" (by the project) initiation of a consultation process, it privileged local dialogue and communal process that allowed the people to decide on undertaking resource management in an inclusive and consultative manner. The resource management activities determined by the villages range from a ban on fish poisoning and declaring prohibitions on portions of their fishing grounds, to targeting land-based issues (such as waste disposal) and rehabilitating natural habitats. This broad range of activities includes and transcends gendered division of duties along customary lines such that the project generates engagement across gender lines.

Consistent with the privileging of their experiences and voices, the villagers "instituted resource management practices that they are convinced are appropriate for their purposes" (Veitayaki, 2007, para. 4). These collectively determined local resource management plans that were developed in each of the six pilot villages formed the basis for the training workshops offered as part of the full initiative, namely: leadership, project planning and preparing project proposals; compost toilets; and smokeless stoves. This consultative local action has been a central feature of the project since the pilot phase in 2001. The soft guidance afforded through regular follow up visits, and substantial training based on locally determined needs, empowered the communities such that they "took their management plans and activities to the island and provincial councils, where they solicited assistance and publicize[d] their activities" (Veitayaki, 2007, para. 3). So, while the initiative privileges collectively determined and comprehensive local action and provided capacity enhancement on an evolving needs basis, it sought political validation of plans rather than transformation of systems.

EU-GCCA Project - Seaqaqa

On the other hand, the EU-GCCA Project in Seaqaqa is a targeted adaptation intervention singularly aimed at alleviating a scarcity of potable water amidst a changing and variable climate. The circumscribed goal of the project and technical response highlights its lack of political consciousness. While both men and women were included in the intervention, the broader agricultural focus of the intervention skewed engagement and inclusion towards men because of the customary gendered division of labour that marks the sector as a male domain. The project framework for this circumscribed intervention is consistent with PaCE-SD's procedural framework for level one or "soft" measures and relevant management plans for community-based activities (see Figure 3). It is crafted to privilege participatory assessment and planning—which is evident from the intervention's predication on a broad-based community needs prioritization exercise—and local adaptive management that significantly drives evaluation and monitoring beyond the official project evaluation that was executed six months after the implementation of the intervention. The local adaptive management that drives evaluation and monitoring beyond the official project evaluation is evident in a myriad of instances, but two are noteworthy for their enabling and efficacy enhancing or efficacy-building potential: a) the requirement for women in Rokosalese, where the main tank is based, to act as custodians on behalf of the multi-enclave settlement's water supply by cleaning it to prevent algae and maintaining water quality; b) training of community members in plumbing and proper installation of water pipes, which allows community members to fix simple water plumbing breakages on the system and at home.

Figure 3: The PaCE-SD Procedural Framework (PaCE-SD, n.d.)



C-CAP Project - Yaqaga

Similarly, the C-CAP Project on Yaqaga is a highly targeted adaptation intervention, but it was aimed at reducing the broader issue of disaster risk and improving disaster response planning amidst a changing and variable climate. The USAID funded initiative was also implemented by PaCE-SD, but in conjunction with DAI, an American development consultancy. Yaqaga is one of three villages across two of the three provinces in Vanua Levu (Yaqaga village in Bua Province and villages of Korotasere and Vusasivo in Cakaudrove Province) to benefit from this project. As outlined in the methodology chapter, the researcher selected Yaqaqa because of two factors that manifestly exacerbates its vulnerability: first, it is the most isolated (only island of the three, lacks paved roads and other critical infrastructural gaps); and second, it is the only village of the three without a creek and/or river. The project framework for this circumscribed intervention that sought to educate and prepare the village to manage disaster

risk by creating a disaster risk preparedness plan (soft) and built a starter shelter (hard infrastructure) is consistent with PACE-SD's procedural framework for level 2 projects (or "soft and hard" measures and relevant management plans – see Figure 3). It is crafted to privilege participatory community-based assessment and planning and local adaptive management. This participatory ethos is evident from the intervention's predication on a broad-based community needs prioritization exercise that entails climate change risk identification and an infrastructure mapping exercise or participatory risk mapping. Even at a more technical level, this participatory community ethic was enabled by geo-referencing the village's social, economic, coastal and water infrastructure assets based on the collective determination of a project committee that constitutes a representative cross-section of the village population (36 people or 23 percent of the population (157) at the time (November 4, 2013), Masilomani, 2013, p. 3), including leaders from men's, women's and youth groups. In addition, the Senior Technical Adviser and the Country Mobilizer guided facilitator-based elements such as the operationalization of the knowledge derived from the community-designed Infrastructure Prioritization Index.

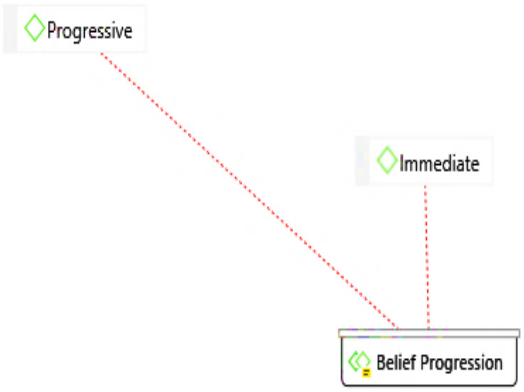
While the C-CAP initiative was also a specific technical response with no manifest political consciousness, or even the validating engagement with the political realm observed in the Gau project conceptualization, it differs from the EU-GCCA intervention in Seaqaqa. Unlike the EU-GCCA intervention, the C-CAP project's conceptualization and deployment of the locally informed Infrastructure Prioritization Index acknowledges the broader scale of the challenge and the piecemeal or limited sufficiency of the intervention and clarifies gaps to be filled in the future by potential partners.

Although the three climate change interventions are distinct in scope, sectoral focus, programmatic design and implementation, they all feature varying but significant levels of

consultation with and active inclusion of members of the communities in which they are implemented. As my comparative review of the project approaches indicates, these consultative and inclusive efforts span conception to post-implementation monitoring. This is significant, as critical perspectives on development and social change identify participation of this scale, particularly from the point of conceptualization, as a central factor for interventions to gain local support and ownership, affirm beneficiaries and even pave the way for alternative imaginings to emerge (Inayatullah (1967) cited in Sparks, 2007, Pieterse, 2001, Melkote and Steeves, 2015). My thematic analytical procedure offers two measures or bases to commence gauging the efficacy of these inclusive and participatory features: belief progression and project perception/inclusion.

Belief Progression

Figure 4: Measures of belief progression upon introduction of climate change initiatives in study sites



Belief progression includes two analytical units (immediate and progressive) that denote how long it took interviewees to accept or commit to a climate change project intervention in a community. Immediate belief is the most significant belief pathway observed in the data with overall prevalence of 16 compared to 11 for progressive belief. The comparatively higher prevalence of immediate belief in the project interventions across the study population is

strongly associated with the inclusive project framework that guides the interventions noted and the nature of the projects. Specifically, all three interventions were designed based on the outcomes from substantial community needs prioritization exercises conducted prior to inception, particularly in Seaqaqa and Yaqaga, which were especially targeted/circumscribed in terms of the nature of the interventions (water supply and disaster risk reduction, respectively).

Conversely, the Gau population, which was exposed to a comprehensive ecosystems-based intervention that required social change and commitment on a significant scale, in addition to making linkages beyond what the community initially perceived, accounts for all but one (10 of 11) instance of progressive belief/commitment to the project. The importance and effectiveness of comprehensive needs prioritization, particularly for circumscribed or targeted interventions, is further underscored by the fact that Yaqaga, which accounts for the only other instance of progressive belief, represents an outlier as the one instance is explicitly attributed to negative perceptions associated with past unaffiliated project interventions of a general nature, as declared by a young woman. The respondent said, "it took me some time to think about it because a lot of government people came and made false promises to us." This shows how project intervention history can impact future project ownership and support. Seaqaqa, as implied above, only recorded immediate belief.

Table 13: The level and nature of belief progression across study sites in Fiji

Villages	Immediate		Progressive	
	Prevalence	Rate	Prevalence	Rate
Lamiti*	12	63%	7	37%
Malawai*	2	40%	3	60%
Seaqaqa	1	100%	0	0%
Yaqaga	1	50%	1	50%
Totals	**16**	**59%**	**11**	**41%**

* Gau village

In addition to inclusive needs prioritization processes and targeted interventions, the primacy of immediate belief observed across the study population is further buttressed by a range of factors, namely perception of the main project agent's expertise, belongingness, knowledge initiation premium and consonance with worldview. The first two factors—perception of the main project agent's expertise/credentials and belongingness—are palpable on both Yaqaga and Gau Islands. The projects implemented on these islands, C-CAP and VTI, were led by Semi Masilomani and Dr. Joeli Veitayaki, who have direct and existing roots in these contexts that renders them the status of Kai (from or belonging to Yaqaga and (Malawai) Gau, respectively). These factors emerged explicitly on Gau, where the intervention was independently initiated and led by Dr. Veitayaki, rather than solely mobilized and technically guided for an external entity as Mr. Masilomani did on Yaqaga (see Excerpt 1, Dialogue A). This conforms with broad consensus in the extant literature about the importance of effective selection of messengers and champions (Moser, 2010; Agyeman et al, 2007) for successful communication. However, the technical level at which the messengers functioned most effectively in this context, Gau and Yaqaga, shows that transcending the focus on messengers as mere functionaries for the diffusion of messages across mediated networks can engender more trust and credibility and create a motive to act. The unique combination of technical capacity and belongingness is likely to reinforce the perception of a champion's stake in a local activity and can thus foster the creation of a resonant and endogenously driven participatory space. This is consistent with progressive contentions proffered (Dutta, 2011; Freire, 1970, 1973; Melkote & Steeves, 2015; Servaes & Malikhao, 2005), as it paves the way for the articulation of change and action with a broader purview than circumscribed action, especially where the project champion's technical role is unencumbered by external project affiliation, as is the case on Yaqaga Island.

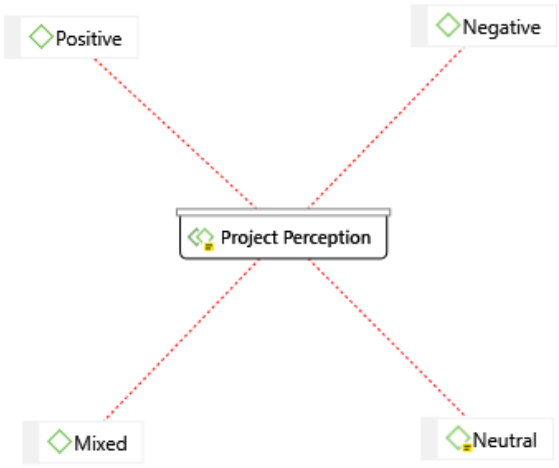
Excerpt 1: Factors enabling immediate belief progression

Dialogue A: Young Men Focus Group – Lamiti Village, Gau Island	Dialogue B: Older Male Interview – Malawai Village, Gau Island
Interviewer: When Joeli first came, did you believe him or it took some time to believe him? ***Respondent (All):*** Yes. ***Respondent 1:*** We believe him. ***Interviewer:*** Why did you believe him? ***Respondent 1:*** Because he is a Doctor and he is from here.	***Interviewer:*** Why did the community feel that what Dr. Joeli said was right? ***Respondent:*** We believe him because he was the first one to come and told us about the climate change on what we are facing, and there's one come to come and teach us about it. ***Interviewer:*** Did it match with some of the thing you're seeing? ***Respondent:*** Yeah.

The data also suggest a premium is accorded to the provision of new information. This knowledge initiation premium is operative where the new information is relevant for addressing prevailing issues (see Excerpt 1, Dialogue B). But, the extent to which the issue-problem proposition conforms to the engaged population's perceptual lenses and worldview seems to be an equally important factor. This is typified by explicit religious rationalization of project support on Gau, as typified by statements in Lamiti, such as: "I believe it because it says in the Bible that a time will come when everything will change." This reinforces the broad consensus in the literature about the importance of values in structuring response to and support for pro-environmental policies and actions, an issue probed in greater detail in the subsection exploring climate agency (Corner et al., 2014; Kearns, 2011; Miller, 2000; Nisbet, 2009).

Project Perception

Figure 5: Markers of project perception across the study populations in Fiji



The second measure from my thematic analytical procedure that aids in gauging the efficacy of the inclusive and participatory features of the project is project perception. Project perception captures how the study population views the projects implemented in their communities. Overall, positive perceptions of the diverse climate change project interventions associated with the study populations are the most grounded project perceptions in the data. On Yaqaga Island, where a disaster risk mitigation initiative was developed based on community prioritization and ownership, positive perceptions are the only markers of project perception that register. A similar though slightly more varied picture is also evident on Gau, where a decade-long, relatively bottom-up, comprehensive ecosystems-based climate change adaptation initiative is underway. Overall, positive project perceptions have a 94 percent prevalence (100 percent in Malawai and 88 percent in Lamiti). However, Lamiti, which accounts for the only variance in the data for Gau, does not exhibit any negative disposition toward the project: neutrality and mixed views account for a tenth and two percent, respectively, of the prevalence of project perceptions captured in the data from the village. This is also consistent with greater knowledge gaps in Lamiti relative to Malawai, as well as a higher tendency in Malawai to regurgitate project

information than in Lamiti, where individual observation has significant resonance as a first source of climate change knowledge (see Table 15: The nature and relative strength of various forms of detectable indicators of climate knowledge in Fiji).

Table 14: The relative nature of project perception in each study site in Fiji

Villages	Mixed		Negative		Neutral		Positive		Density
	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Lamiti*	1	2%	0	0%	5	10%	42	88%	48
Malawai*	0	0%	0	0%	0	0%	33	100%	33
Seaqaqa	1	13%	3	38%	1	13%	3	38%	8
Yaqaga	0	0%	0	0%	0	0%	3	100%	3
Totals	**2**	**2%**	**3**	**3%**	**6**	**7%**	**81**	**88%**	**92**

* Gau village

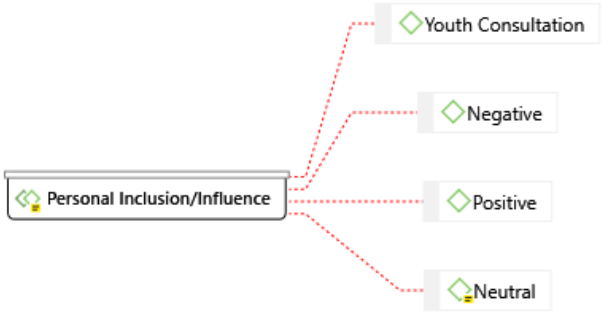
Consistent with the intractable nature of the primary climate change-induced challenge facing Seaqaqa, water scarcity, which the EU-GCCA project sough to tackle, Seaqaqa is the only study population where explicitly negative project perceptions were registered. With a prevalence exceeding a third (38 percent), negative project perceptions are equal to positive project perceptions, particularly as mixed and neutral perceptions also have equal prevalence (13 percent each). This is consistent with the level of climate change knowledge and ideation in the village. As the study population with the narrowest and most recent range of initial climate change knowledge acquisition (only the project intervention), the study population may be conflating a targeted climate change adaptation measure (water scarcity), which is a coping strategy still subject to the vagaries of a changing and variable climate, with an overarching solution to the community determined priority issue that the project sought to tackle. This reading is informed by the nature and framing of the negative project perceptions expressed by the study population. An emblematic response to whether the project was good or beneficial is, "no, because we are having water cuts every day, even today" (Respondent 1 – Older Women's Focus Group, Navai, Seaqaqa). So, more broadly, the inference is also supported by the significant knowledge gap evident in the study population, despite the manifest connection between their climate change-induced challenge and the especially limited or targeted ideation

afforded by the project intervention. This suggests a need for ongoing climate change edification in the community, which is also supported by the community's strong preference for climate leadership by external forces and exceptional individuals (45 percent of relative prevalence, see Table 24). As will be evident during the subsequent explication of the climate leadership theme, the absence of the self or kin nomination (family) as a preference suggests the outward look, which compares favourably to the confidence reposed in communal leadership, is an interest in tapping expertise not found within their place of abode to inform and aid them to tackle their acute climate change induced challenges, particularly water and crop yield.

While significant levels of explicit negative views in Seaqaqa marked project perception, the contextual factors noted based on observations in the dataset and further elucidated in succeeding sections suggest the inclusive project framework and the nature of the project strongly correlates with positive perceptions. The consistency of this observation with the higher prevalence of immediate belief on the first measure strongly suggests a high degree of efficacy of the inclusive and consultative features alongside the nature of the project and contextual factors such as knowledge levels and sources.

Personal Inclusion/Influence

Figure 6: Markers of perceived personal inclusion and influence on climate adaptation interventions in Fiji



This is further buttressed by uniformly positive expressions of personal inclusion/influence across all three study populations. Personal inclusion/influence captures the

study population's perception about the project's level of inclusion, particularly their experience of engagement with project leadership; as well as views on how well the project reflects community priorities. So, its consistency with overall project perception reinforces the observation that the multi-stage inclusive and consultative nature of the climate adaptation engagements affects project perceptions. The extent to which this impacts effectiveness with respect to activity recollection and linkage with climate change and project priorities is subject to a closer review of the climate actions highlighted by the study populations, knowledge levels and agency, which are explored in detail in subsequent sections. But, it is instructive to note that while there are absolute positive expressions of personal influence/inclusion, there is a noteworthy lack of youth specific consultation as in all contexts, only gendered groups comprised of adults are directly engaged in decision-making. While the data suggests the absence of youth-specific consultation is inconsequential for perception of personal inclusion and influence, this may mask cultural factors that influence responses. Specifically, it may be attributed to the duty bound or communal nature of both indigenous contexts, where traditional structures and authority are highly regarded and maintained. So, this may be understood as acceptance of one's place or position in an unchallenged social order where age confers status and engagement privileges (Veitayaki, 2007)**.** This assertion about age-based deference and privileges is supported by the ready conformance expressed by young men on Gau when probed about their inclusion and influence over the climate change adaptation activities underway in their village (Excerpt 2: Dialogue A).

Excerpt 2: Age-based deference and perceptions of influence and inclusion on Gau Island

Dialogue A: Young Men Focus Group – Gau Island
Interviewer: Before Dr. Joeli started the programme, did he meet with the young people to find out if there is a problem? Do you think you can be able to say or comment on things? You wanted it?

Respondent (ALL): No

Interviewer: Do you think you can call Dr. Joeli and say we can do these things too? You think they will listen to you?

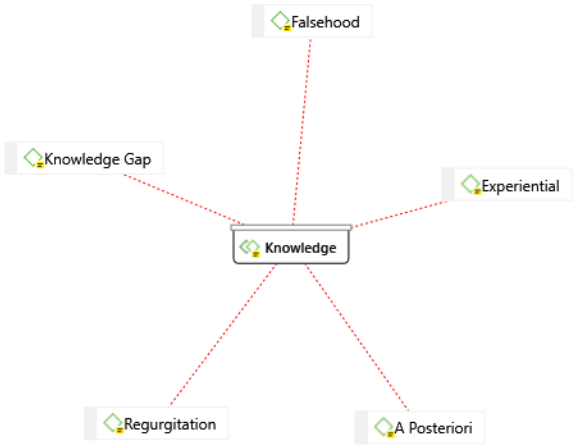
Respondent 1: Explain again.

Interviewer: If you wanted to say these things…

Respondent 1: Joeli says the plan and we do.

Climate Knowledge

Figure 7: The core indicators of the nature of climate change knowledge in Fiji.



Considering the central role of participation in paving the way for alternative imaginings (Dutta, 2011; Freire, 1970, 1973; Melkote & Steeves, 2015; Servaes & Malikhao, 2005), climate knowledge and the sources of such knowledge can also offer insight into the efficacy of the inclusive and consultative engagement features that varyingly mark the three interventions associated with the study populations. Climate knowledge denotes both an awareness of climate change, its cause, impact and the responses it warrants. As shown in figure 5, this study takes stock of the state of knowledge in the study population using five metrics or units of analyses that record statements through which the study population links climate change causes and effects, indicators and practices.

Table 15: The nature and relative strength of various forms of detectable indicators of climate knowledge in Fiji

Villages	A Posteriori		Experiential		Knowledge Gap		Regurgitation		Density
	Prevalence	Rate	Prevalence	Rate	Prevalence	Rate	Prevalence	Rate	
Lamiti*	16	53%	6	20%	7	23%	2	7%	30
Malawai*	21	75%	1	4%	3	11%	3	11%	28
Seaqaqa	7	78%	0	0%	2	22%	0	0%	9
Yaqaga	3	60%	0	0%	2	40%	0	0%	5
Totals	**47**	**65%**	**7**	**10%**	**14**	**19%**	**5**	**7%**	**72**

* Gau villages

A posteriori knowledge, which are statements about climate change causes and effects, indicators and practices based on what an individual observes and their reflections as well as attribution of responsibility (see Excerpt 4, Dialogue B), is the most grounded of all knowledge indicators in the data overall (65 percent prevalence). However, knowledge gaps follow with a prevalence of nearly a fifth (19 percent). Regurgitation and experiential knowledge also figure significantly, but only in the Gau study population, which warrants a more granular examination of the data across village and project subsets.

On Gau, a posteriori knowledge figures most prominently with a prevalence averaging 64 percent. However, the rate is significantly lower in Lamiti (53 percent) than it is in Malawai (75 percent). Knowledge gap (17 percent or 10 of 58), experiential knowledge (10 percent or seven in 58) and regurgitation (nine percent or five of 58) account for the other statistically significant indicators of knowledge forms in the population subset. However, these three associated factors figure differentially in each village in a manner that explicates the divergence in a posteriori knowledge detected in the two neighbouring villages. The lower rate of a posteriori knowledge in Lamiti is consistent with a vastly higher degree of experiential knowledge in the village (20 percent prevalence) than in Malawai (four percent), and a greater degree of knowledge gaps (23 percent prevalence in Lamiti) compared to Malawai (11 percent). Knowledge gaps are also less prevalent in Malawai because respondents in this sub-set had a higher tendency to regurgitate (see Excerpt 6, Dialogue D) project information (11 percent prevalence versus seven percent in

Lamiti), which is less likely to exacerbate or create opportunities for knowledge gaps to emerge versus when experiential knowledge is invoked (see Excerpt 5, Dialogue C).

Excerpt 3: The intractable nature of knowledge gaps in Seaqaqa

Dialogue A: Knowledge Gap: Older Men Focus Group - Rokosalase, Seaqaqa
Interviewer: When you hear climate change, what comes to your mind?
Respondent 1: All of us are from Lau, where we experience rise in sea level, so we need assistance from bigger countries.
Interviewer: Apart from the grant assistance, what kind of help do you need from outside?
Respondent 1: As a farmer, we need a lot of assistance for fertilizer, etc.
Respondent 2: We want the cost of distilleries to go down.
Interviewer: How does climate change affect you as a farmer?
Respondent 2: Before we used to have more rain, in nowadays we hardly receive rain, so it affects the soil.
Respondent 2: Even the soil is very old because of too much dry weather, soil tends to become very hard. So, it is very difficult to do the planting.
Interviewer: Can we do anything about climate change, or limit its impact inside the village?
Respondent 1: Yes, after using the weedicide bottles, avoid burning it. We can dig the hole and bury it.

Only a posteriori knowledge and knowledge gaps were observed in the Seaqaqa and Yaqaga study populations. Seaqaqa records the highest degree of a posteriori knowledge (78 percent) relative to the other two island populations (64 percent on Gau and 60 percent on Yaqaga Island). This is consistent with the nature of the primary ways in which climate change-induced impacts have affected the communities, particularly as expressed through the fundamental ways in which they express signs/indicators of climate change. Specifically, Seaqaqa disproportionately identifies an acute water challenge as its primary indicator of their climate change-induced challenges, which is both scientifically supported and especially more manifestly tied to their lived observations, experiences, communal discussions and the project interventions implemented in their community. However, the manifest connection also brings into focus the knowledge gap in Seaqaqa (see Excerpt 3, Dialogue A: Knowledge Gap). The knowledge gap, which stands at over a fifth (22 percent prevalence) despite the manifest

connection between their climate change-induced challenge and targeted ideation (exposure to climate change knowledge through the project), is particularly high. This is especially so as it is still higher than the knowledge gap observed on Gau (17 percent), which features a sustained and comprehensive climate change adaptation intervention in a context affected by climate change-induced events in more complex ways.

Continuing the connection between climate change knowledge and the primary ways in which climate change-induced impacts affect communities (per the signs and indicators they note), Yaqaga—which identifies coastal erosion as its most significant indicator of climate change and exhibits a degree of fatalism marked by failed efforts to build a makeshift seawall for a generation—records the highest level of knowledge gap (40 percent).

Excerpt 4: Multi-layered and personalized premium climate knowledge (a Posteriori) on Gau Island

Dialogue B: A Posteriori Knowledge – Excerpt – Older Women Focus Group, Malawai Village, Gau Island
Interviewer: Can you tell me the technique that you used to fish? So [Respondent 1] what do you use?
Respondent 1 & 2: The fishing line
Interviewer: Fishing line? Oh that is how everyone fish?
Respondent 3: Fishing net.
Interviewer: Sometimes you go out on the boat?
Respondent 4: This lady here [Respondent 2] goes out on the boat but uses the fishing line.
Respondent 1: Fishing net
Interviewer: Do you like to get more? So that is the traditional way? Do you used to spear or things like that?
Respondent 4: Yeah.
Interviewer: This is what I need to know.
Respondent 4: Sometimes we go out to the 'qoli nunu'
Interviewer: Tell me in detail, you use the fishing line, the spear, what else do you use?
Respondent 4: The 'qoli nunu' we use the spear and what you call the goggles that's all.
Interviewer: How do you deal with the corals? Do you take care of them? Tell me how you interact?
Respondent 4: Before there is lot of corals but now no more.
Interviewer: Do you think the way you fish affects the coral?

Respondent 4 & 3: Yeah.

Interviewer: Like how?

Respondent 4: When we see an octopus, we'll use the stone to break down the coral

Interviewer: So, you're learning new ways of fishing by breaking down this coral and learning how to fish? Is that the only way?

Respondent 4: We can use only the spear

Interviewer: Which one is easier- stone or the spear?

Respondent (ALL): Spear.

Respondent 4: If it doesn't come out then we will use the spear.

Interviewer: Okay so spear is alright. I get that.

Excerpt 5: Correlation between higher prevalence of experiential knowledge and knowledge gaps

Dialogue C: Experiential Knowledge & Knowledge Gap: Young Women Focus Group, Lamiti Village, Gau Island

Interviewer: Is there anything happening in your village that makes you think of climate change?

Respondent 1: In 2013, there was an earthquake here that makes us think of climate change.

Respondent 2: Cyclone Winston.

Respondent 3: Landslides during Cyclone Winston in 2015 make us difficult to get food.

Excerpt 6: Regurgitation limits knowledge gaps in Malawai Village, Gau Island

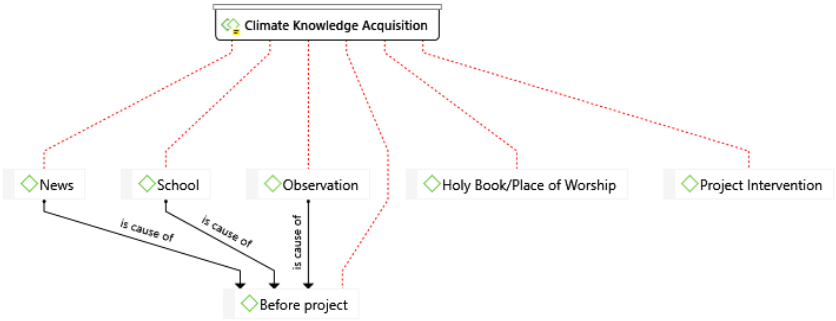
Dialogue D: Regurgitation Excerpt: Older Male – Malawai Village, Gau Island

Interviewer: Is there anything you think you can do as a community or as a person to limit the damage climate change?

Respondent: Yes, according to Dr. Joeli, he told us to plant more mangroves along the beaches, to plant more trees and to stop cutting down many trees and also not to burn our areas.

Climate Knowledge Acquisition

Figure 8: The range of initial sources of climate knowledge in Fiji



The varied knowledge levels across the projects support the view that the nature of the project interventions (duration and focus) and the problem formulation impact the efficacy of the comprehensive inclusion, consultative frameworks and procedures guiding the three projects. The data relevant to climate knowledge acquisition (when and where people learn about climate change) across village and project subsets suggests that the degree and depth of ideational exposure is also a consequential factor. Ideational exposure refers to the extent and time committed to discussing climate impacts, their cause and the range of responses they demand, which varies significantly across the projects (targeted and limited in Seaqaqa and on Yaqaga, but comprehensive and sustained over a decade on Gau). The prevalence ratios of the six analytical units used to capture climate knowledge acquisition across the study populations makes this manifestly clear. Overall, it is the project intervention (a formal means of informational transfer), with a prevalence of nearly a half (49 percent), that is the main means through which respondents first learn about climate change. The only other significantly grounded sources of initial climate knowledge in the overall study population are School (21 percent), observation (16 percent) and knowledge acquired before the project (nine percent) through a multiplicity of unspecified means.

Table 16: The relative prevalence of initial sources of climate knowledge in Fiji

Village	Before Project		Holy Book		News		Observation		Project Intervention		School		Density
	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Lamiti*	3	18%	0	0%	0	0%	2	12%	9	53%	3	18%	17
Malawai*	0	0%	1	7%	1	7%	4	27%	6	40%	3	20%	15
Seaqaqa	0	0%	0	0%	0	0%	0	0%	4	100 %	0	0%	4
Yaqaga	1	14%	0	0%	0	0%	1	14%	2	29%	3	43%	7
Totals	**4**	9%	**1**	2%	**1**	2%	**7**	16%	**21**	49%	**9**	21%	**43**

*Gau village

At a more granular level, climate knowledge acquisition is more varied and better illustrates the consequential nature of ideational exposure (time and scope) for knowledge levels, and the efficacy of climate change projects. Seaqaqa, the locale with the least degree of climate

change agency (detailed in a later subsection, also see Table 22) and significant knowledge gaps, only registers the project intervention as their first exposure to climate change knowledge. This first and only exposure at the time of study means the consultative and inclusive project designed that provided climate change information oriented specifically to the climate change-induced water scarcity challenge prioritized by the community is a consequential factor for knowledge levels. But, the data suggests this circumscribed ideational exposure may have been insufficient to address the prevailing knowledge deficits, which, as observed earlier, accounted for more than a fifth of the prevalence for knowledge on climate change in spite of the manifest connection between the climate change challenge they prioritized and was specifically tackled by the intervention. This strong correlation between a narrow climate change knowledge acquisition base, circumscribed ideational exposure and climate knowledge gap in Seaqaqa may also account for earlier observation of comparatively low project perception, despite general appreciation for the intervention and high perception of inclusion and influence over the project. The data for the other two villages and project subsets supports this claim, particularly concerning the range of climate change knowledge acquisition sources.

While the project intervention also ranks foremost as the initial instance of climate change knowledge acquisition in both villages on Gau, it only accounts for a thematic prevalence of 47 percent (or 15 of 32). School and observation follow with prevalence of nearly a fifth each (19 percent). The near identical sources of climate change knowledge between the two village populations on Gau Island is consistent with their identical population composition, proximity (10 minutes apart via a footpath and two wooden pedestrian bridges), contextual and ideational exposure under the same comprehensive and sustained ecosystems-based adaptation initiative. This reinforces the importance of the project intervention for ideational exposure on climate

change and suggests the range of initial or overall climate change knowledge acquisition sources is another equally consequential factor. The climate knowledge acquisition patterns observed on Yaqaga Island strongly supports this observation. Although the project intervention also features as a prominent source of climate change knowledge acquisition on Yaqaga Island, the level of prevalence, less than a third (29 percent), detected is secondary to school (43 percent prevalence) as a source of initial climate change knowledge acquisition. This distinguishes Yaqaga from Seaqaqa (maximal) and Gau (47 percent) where project intervention is the most common initial source of climate change knowledge acquisition. Observation, which registers a prevalence of 14 percent, is the only other source of climate change knowledge acquisition on Yaqaga Island.

So, the diversity of initial climate change knowledge acquisition sources on both Gau Island (6 overall – four in Lamiti and five in Malawai) and Yaqaga Island (four), particularly those that are manifestly credible (news, school and project intervention with 69 percent prevalence on Gau; school and project intervention at 72 percent prevalence on Yaqaga), strongly correlate with the higher degree of climate change agency and knowledge detected on these islands relative to Seaqaqa, which only shows first engagement through an issue-specific and time-bound project intervention. This suggests concerns about climate knowledge and information provision (Maibach et al., 2008; Yang & Ho, 2017) are credible but should also contemplate the significance of the rate of information provision, range and nature of information sources, to effectively attenuate the limitations of individual barriers to climate change communication and action. Per Lorenzoni et al. (2007), these include a lack of knowledge, absence of desire to seek information and limited availability of relevant or accessible information. Therefore, a closer look at how climate change is perceived may

simultaneous offer insights as to how the factors identified affect the efficacy of the interventions overall and shed light on what and how the study population interprets and associates events and changes with climate change.

Signs and Indicators

Figure 9: The primary signs and indicators of climate change perceived in Fiji

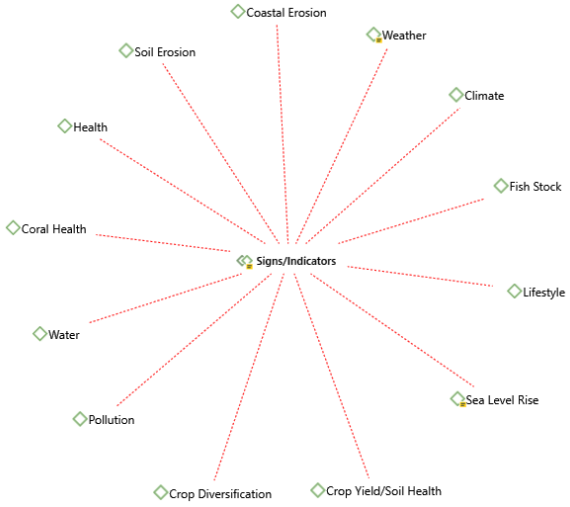


Table 17: The relative prevalence of six of 13 signs in Fiji in alphabetical order.

Village	Climate		Coastal Erosion		Coral Health		Crop Diversification		Crop Yield/Soil Health		Fish Stock		Density of Signs
	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Lamiti*	2	3%	5	6%	2	3%	0	0%	21	26%	8	10%	80
Malawai*	5	4%	6	5%	4	3%	2	2%	24	21%	27	23%	117
Seaqaqa	1	1%	0	0%	0	0%	1	1%	18	23%	0	0%	79
Yaqaga	0	0%	9	21%	3	7%	0	0%	4	10%	7	17%	42
Totals	**8**	**3%**	**20**	**6%**	**9**	**3%**	**3**	**1%**	**67**	**21%**	**42**	**13%**	**318**

*Gau villages

Table 18: The relative prevalence of seven of 13 signs in Fiji in alphabetical order

Village	Health		Lifestyle		Pollution		Sea Level Rise		Soil Erosion		Water		Weather		Density
	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Lamiti*	1	1%	1	1%	0	0%	5	6%	14	18%	0	0%	21	26%	80
Malawai*	2	2%	14	12%	0	0%	11	9%	10	9%	0	0%	12	10%	117
Seaqaqa	0	0%	0	0%	1	1%	1	1%	5	6%	36	46%	16	20%	79
Yaqaga	0	0%	0	0%	0	0%	4	10%	4	10%	0	0%	11	26%	42
Totals	3	1%	15	5%	1	0%	21	7%	33	10%	36	11%	60	19%	318

*Gau villages

The data offers 13 social, environmental, philosophical and existential markers that the study populations deem to be signs and indicators of climate change, which are observable or

likely to impact their place of abode (see Figure 9). Crop yield/soil health is the most significant indicator of climate change with a prevalence of over a fifth (21 percent) across the study populations. Weather, fish stock, water and soil erosion round off the top five most prominent indicators of climate change among the study populations (19, 13, 11 and 10 percent, respectively, see Tables 8 and 9). The prominence of both crop yield and fish stock (accounting for more than a third of relative prevalence for the 13 indicators, see Tables 17 and 18) suggests these communities perceive climate change as an immediate existential issue that is directly and routinely experienced by way of what appears on their plates. This strong food security theme is underscored by concerns about water (11 percent), coral health (three percent), and crop diversity (one percent), which would result in a thematic prevalence of nearly a half (48 percent) when combined with the prevalence associated with crop yield and fish stock (see Tables 17 and 18). Dialogues A to D in Excerpt 7 exemplify this theme across the study populations:

Excerpt 7: Food stock and associated domains are highly resonant signs and indicators of climate change in Fiji

Dialogue A: Older Women Focus Group - Yaqaga Island	**Dialogue B: Older Male - Gau Island**	**Dialogue C: Older Women Focus Group – Navai, Seaqaqa**	**Dialogue D: Older Men Focus Group - Yaqaga**
Interviewer: So, when you hear about climate change, what do you think about it? ***Respondent 1:*** It's the weather changing, soil erosion. ***Interviewer:*** How does that affect you? ***Respondent 1:*** Before we use to eat big yams, nowadays just a small one and we [are] experiencing hot weather which maybe affects the crops. ***Interviewer:*** Does that affect how you build your houses, too? ***General Response:*** Yes, before we use to stay in Fijian house (bure) and we need to change it in every year. So, building modern houses is much better and is much safer from hurricanes, too.	***Interviewer:*** Is there, can you discuss some of the changes you see? You talked to me about the cutting down of trees, the soil you talked about the rubbish what else did you see? ***Respondent 2:*** Even the fish before our grandmas they went fishing they got plenty but nowadays they can go out in the morning they come back in the afternoon still they got nothing. ***Interviewer:*** Why is that such a big thing if they come back with no fish? What does that mean? What impact does that have on families? ***Respondent 2:*** It was not like that before as we have to look for something again for our dinner.	***Interviewer***: When you hear about climate change, what comes to mind? ***Respondent 2:*** Changing of weather, due to this dry season… we are having smaller fruits and many of the fruits get bad.	***Interviewer:*** How about in your farm, do you see anyway climate change affecting you farm? ***Respondent 4:*** Yes, like dry season our crops take much time to mature and result in affecting our produce, even the cassava is too hard to chew and also takes much time to cook.

Interviewer: Is there any way your village is being affected by climate change? ***Respondent 2:*** Yeah, we go out at night for fishing and diving and the water is too cold compared to before and it affects our catch too.			

Although significantly attenuated by contextual factors, the comparable range of signs and indicators across the villages studied and the prevalence of this food security theme also underscores this observation. Of the 13 signs and indicators of climate change derived from the Fijian dataset, 10 are active in Lamiti versus 11 in Malawai, while Seaqaqa and Yaqaga Island registered eight and seven, respectively (see Tables 17 and 8). The consistency of these markers of climate experience and perception in indigenous and traditional communities studied in Fiji may also be attributable to their common intimate connection with and co-dependence on largely common aspects of the natural environment. Figueroa (2011) contends that the loss or diminishment of this "amalgamation of cultural identities, ways of life and self-perceptions that are connected to a given group's physical environment" (p. 233) underscores the relevance of the environmental justice frame that should underpin climate adaptation action. This is even more critical, as even elements of differentiation in this relationship between markers of climate change and perception across these communities reinforce the degree to which context impacts the signs and indicators articulated.

On Gau, crop yield/soil health (23 percent), fish stock (18 percent) and weather (17 percent) account for over half (57 percent) of the prevalence of signs/indicators of climate change. While these three signs emerge as the primary ways through which the study population in both villages studied on the island perceive climate change, soil erosion and sea level rise also figure prominently with prevalence of 12 percent and eight percent, respectively. While crop yield/soil health (four), fish stock (seven) and weather (11) also account for more than half (52

percent) of the density of signs of climate change on Yaqaga Island, which is a similar geographical and environmental context as Gau, the salience or prominence of the signs and indicators are ranked differently (see Tables 17 and 18). Weather (26 percent), coastal erosion (21 percent) and fish stock (17 percent) mark the top-tier, while crop yield/soil health, sea level rise and soil erosion also feature prominently with a density of nearly a tenth each. The similarity in the signs noted in these two comparable study contexts highlights the significance of experiential knowledge, particularly those derived from direct climate risks and climate change-induced angst, as well as collective reflection in defining and articulating climate change experiences and action. This is evident from how Yaqaga Island's more pressing and direct contemporary experience with coastal erosion differentiates an otherwise identical signs and perception framework across the two island communities (Gau and Yaqaga Islands), notwithstanding the significant difference in the scope and duration of the climate change ideational experiences the study populations have been afforded.

The prevalence of signs and indicators observed in Seaqaqa strongly supports these observations about context and ideational experiences through climate change projects (see Tables 17 and 18). Ideationally, one observes a smaller though identical subset of codes being used in both Seaqaqa (eight codes) and Yaqaga Island (seven codes), relative to Gau (average of 10). This is especially evident where codes indicative of a more complex link with climate change, such as health and lifestyle—which are only incorporated in specialist or comprehensive climate change programmes, only appears in the Gau population dataset that experienced a sustained decade-long climate change ecosystems-based initiative. With respect to context and geography, one also observes that the signs/indicators differ from both Seaqaqa and Gau in a manner that reflects the peculiar climate change-induced exigencies of an inland sugarcane

farming community. Water (46 percent), crop yield/soil health (23 percent) and weather (20 percent) account for the majority (89 percent) of the prevalence of signs/indicators of climate change; with soil erosion (six percent) being the only other statistically significant marker of climate change in this population.

So important is context in shaping how people perceive climate change that water, which does not register in the study populations on the relatively pristine islands of Yaqaga and Gau, dominates the frame through which the study population in Seaqaqa, an arid inland region of Vanua Levu, perceives climate change. Consistent with this contextual note, the Seaqaqa subset, from whose imaginary and daily experience the sea and elements associated with this domain are visually and experientially distant, did not register climate change signs/indicators associated with the domain of the sea (coastal erosion, coral health or fish stock), except for one instance of sea-level rise. This suggests contextual factors such as proximity to domains (land, sea, waterways, among other things) affected by climate change-induced events strongly influence the signs/indicators of climate change that define people's perception of climate change.

Climate Action

Figure 10: The array of current climate actions identified by study populations in Fijian villages

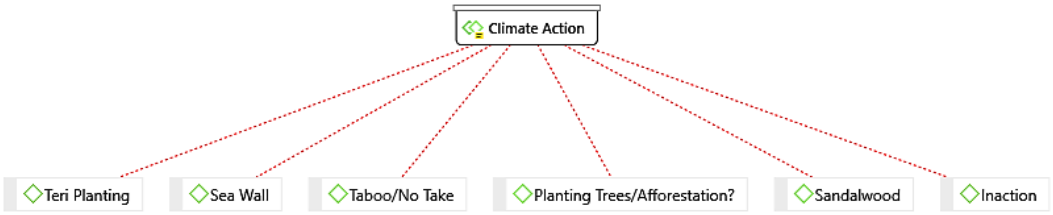


Table 19: The relative prevalence of climate actions identified by study populations in Fijian villages

Village	Inaction		Planting Trees/Afforestation		Sandalwood		Sea Wall		Taboo/No Take		Teri Planting		Climate Action
	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev
Lamiti*	0	0%	8	21%	0	0%	9	24%	10	26%	17	45%	38
Malawai*	0	0%	6	23%	1	4%	6	23%	3	12%	16	62%	26
Seaqaqa	4	100 %	0	0%	0	0%	0	0%	0	0%	0	0%	4
Yaqaga	0	0%	0	0%	0	0%	1	14%	7	100%	0	0%	7
Totals	**4**	**5%**	**14**	**19%**	**1**	**1%**	**16**	**21%**	**20**	**27%**	**33**	**44%**	**75**

*Gau villages

Activities underway across the village that the study population describe or identify as climate change responses, whether or not they are personally involved (climate actions), reinforce the connections observed between context and ideational experiences through the climate change projects and the efficacy of these conceptually inclusive interventions. As shown in Figure 10, six measures or analytical units are employed to examine the data for what is considered a climate action. Consistent with the comprehensive nature of their long-standing climate change adaptation ideation and programming, Gau records a disproportionately higher range of climate change activities with a higher rate of resonance across the study populations in both Lamiti and Malawai (see Table 19). The only difference that marks these two villages is that the second and third most grounded climate actions for the combined study population, taboo/no take activity (19 percent or 13 of 64) and the sea wall (24 percent or 15 in 64), are significantly more resonant in Lamiti (taboo/no take 26 percent and sea wall 24 percent) than Malawai (12 percent and 23 percent, respectively). This can be explained by socio-geological factors in Lamiti, which has more divers who trade commercially and is a larger village with greater coastal and river/tributary exposure.

On the other hand, Yaqaga Island records two distinct climate change actions (taboo/no take and sea wall – see Table 19), both of which are not explicitly associated with the nature or focus of the disaster reduction-oriented climate change intervention they were exposed to. This, as later described, suggests the high degree of climate change agency detected in this population is specifically active local agency, as evident from the endogenous generation's long effort to build a sea wall without external prompting. Of the seven unique instances in which climate change action emerge in the dataset, the taboo/no take accounts for the totality of prevalence among the population subset. It is the most resonant activity, which is congruent with the fact

that fishing is the primary income generating activity in the village and this activity both preserves income generation and their food stock. The sea wall, which has a relative prevalence of 14 percent, was mentioned in a secondary fashion alongside the dominant climate change activity underway in the village.

Seaqaqa, which was exposed to a single targeted climate change adaptation intervention and lacks any sustained endogenous climate change ideation or action, only registers inaction with a total prevalence of four (see Table 19). This inability to recognize the connection between the manifest climate change-induced water scarcity challenge in the settlement and the broader phenomenon is consistent with the higher proportion of negative climate agency, negative project perception and knowledge gaps, as profiled in Excerpt 8 - Dialogues A and B.

Excerpt 8: Knowledge gaps precludes the identification of climate actions in Seaqaqa, Fiji

Dialogue A – Male – Navai, Seaqaqa	**Dialogue B: Older Women Focus Group – Navai and Navundi, Seaqaqa**
Interviewer: Is your village working on any kind climate change project? ***Respondent:*** No. ***Interviewer:*** Does climate change make you fearful? ***Respondent:*** Yes. ***Interviewer:*** What do you want the village to do about climate change? ***Respondent:*** Minimize the destruction of trees.	***Interviewer:*** Has there been any climate change project? ***Respondent 1, 2 &3:*** No, none so far.

This probing of what the study population deems climate actions suggests a significant link between the range of climate change actions and the ideational experiences through the climate change projects. This reinforces a similar link observed between the range of signs and indicators, although significantly influenced by context and the range of climate change knowledge acquisition sources, which shows the project intervention to be a significant factor across the board. These declarations of climate actions are even more revelatory when read against the activities identified by the project interventions.

Consistent with finding that inaction accounts for the totality of prevalence for climate action in Seaqaqa the study population's low project perception and significant knowledge gaps

associated with the circumscribed ideational exposure accorded by the project—their primary climate knowledge acquisition source, there is no conformance with the project's description as a climate change intervention. However, all four projects identified successes that conform with the expressions of the study population (operational water tanks, use of plumbing skills for community purposes, household sanitary facilities, establishment of water committees, etc.).

On Gau, all but three of the 11 activities identified by the project are reflected in the set of actions considered climate actions by the study population exposed to the project intervention. The activities that were not mentioned are the re-emergence of the Fiji Petrel (a bird species) off the coast in May 2009, submerged fish aggregation devices to boost catch and the distribution of renewable energy household tools, such as solar light and smokeless stoves. A similar level of discrepancy also appears in what the project deems a climate change success and the perceptions of the community. The project outlines 14 indicators of success, but only four are explicitly mentioned as climate change successes by the study population. Project declared markers of success such as sanitation—the protection of water catchment critical to the health of the communities, improved management of hazardous waste, planting of pandanus or voivoi to make mats for income generation and buildings, income generating taro gardening in Lamiti, the operation of a cattle farm by the youth council and multi-cropping—are not mentioned as climate change issues by the study population. The other two projects' declared markers of success refer to the increased involvement of women and youth, which is corroborated by evidence of full participation in the data but is confounded by earlier observation of the absence of youth specific consultation and a likely unchallenged age-based deferential order that accords privileges to elders.

Conversely, there is consonance between all five actions and causes profiled by the C-CAP Project for Yaqaga Island. This consonance is consistent with the community defined nature of the circumscribed interventions they were exposed to. However, the dissonance between project identified climate actions and successes observed in the study populations in the other two contexts is variably marked by a high degree of domesticity (smokeless stoves, solar lights on Gau) or routine existence (water tanks, tasks and skills in Seaqaqa and sanitation on both Gau and Seaqaqa), income generation activities (Gau) and specialist factors (re-emergence of species and use of fish aggregation devices). The data thus far suggests this is a function of knowledge, primarily in the Seaqaqa context where misconceptions or a significant knowledge gap attenuates both perception of the circumscribed project intervention and the limited ideation it afforded, alongside a narrow range of climate knowledge acquisition sources precludes the population from linking manifest climate actions with the climate change phenomenon. This suggests understanding of what causes climate change may be a factor in demarcating what the study populations on Gau and across the Seaqaqa settlements perceive as a climate change action in terms of proximity, even in contexts such as Gau where the scope, scale and duration of the climate change intervention is comprehensive and sustained.

As observed in my scrutiny of population-defined climate actions relative to project-declared actions and successes, especially proximal actions (routine, domestic and income generating)—while recognized as ongoing, are not identified as climate change actions in both sites. Similarly, distal and specialist actions (re-emergence of bird species and use of submerged fish aggregation devices) have no prevalence in the dataset for Gau. This is highly significant, as it confounds widely accepted notions in the extant literature. On one hand, it is postured that proximal limitations on climate perception, action, agency and knowledge are singularly

associated with temporally and spatially distal concerns, such as multi-generational projection of impacts and geographical distance from endangered islands and/or species such as polar bears (Lorenzoni & Pidgeon, 2006; Moser, 2010; O'Neil & Hulme, 2009; Spence & Pidgeon, 2010; Weber, 2006). On the other hand, there is the contention that spatial proximity, particularly on the frontiers, accords higher levels of climate awareness and knowledge (Galloway, 2010). This warrants closer scrutiny, considering the paucity of probity of the proximity thesis, beyond discrete experimental observations, such as Herring et al.'s (2016) study of data visualization of climate science that indicates a greater degree of salience of temporal rather than spatial proximity.

Cause and Proximity

Figure 11: The perceived causes of climate change and their associations in Fijian villages

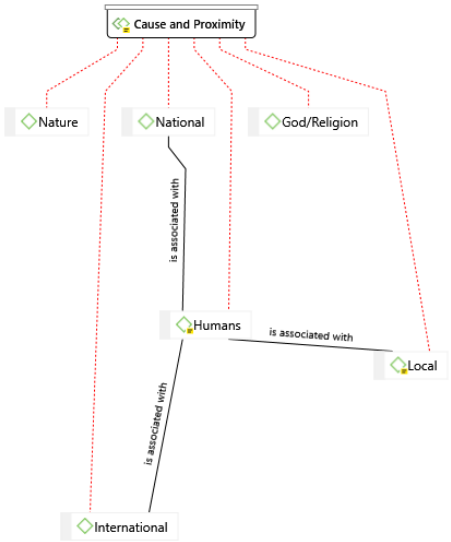


Table 20: The relative prevalence of perceived causes of climate change across study populations in Fiji

Village	God/Religion		Humans		International		Local		Nature		Cause and Proximity
	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Lamiti*	1	100%	0	0%	0	0%	0	0%	0	0%	1
Malawai*	7	100%	0	0%	0	0%	0	0%	0	0%	7
Seaqaqa	0	0%	13	93%	1	7%	2	14%	0	0%	14
Yaqaga	0	0%	4	80%	2	40%	2	40%	1	20%	5
Totals	**8**	**30%**	**17**	**63%**	**3**	**11%**	**4**	**15%**	**1**	**4%**	**27**

*Gau village

Scrutiny of the data pertaining to cause and to proximity further confirms the proximity bifurcation of perception and understanding of what constitutes a climate action. More importantly, it reinforces the observations about the strong correlation between the range and nature of climate knowledge, knowledge acquisition sources and ideational exposure offered through climate adaptation initiatives. These observations, particularly the importance of a wide range of knowledge acquisition sources and sustained ideational exposure offered by climate change interventions, are accessed using the analytical units associated with the theme of cause and proximity (see Figure 11). It captures the study population's perceptions of what accounts for climate change and the type of connections they make with their actions and the actions of others at various scales. While humans are primarily seen as the cause of climate change activity overall, this attribution is only evident in Seaqaqa on Vanua Levu and Yaqaga Village on Yaqaga Island with a prevalence of 93 percent and 80 percent, respectively (see Table 20).

The attribution to human activity as the primary cause of climate change though overwhelming expressed generally in Seaqaqa (11 of 13), except two instances where local human activity was explicitly cited, was equally attributed to local and international human activity on Yaqaga. Beyond this strong emphasis on human activity as a primary factor for climate change, the only other attributions recorded were distal, perceptible but out of their control or immutable. Specifically, one international reference to industrial activity and mechanization in Seaqaqa and one attribution to nature on Yaqaga Island (see Excerpt 9, Dialogue A – Nature - Yaqaga Island), which is consistent with related expressions of low or no climate change agency in both contexts, as detailed in subsequent sections. The high degree of human attribution in Seaqaqa appears to be inconsistent with the patently nature-oriented climate change impacts they highlight, but subsequent probing of low levels of agency suggests this

observation is consistent with the prevailing climate perception and experiences among the study subset. So, while the data does not conclusively indicate the extent to which proximal (local) or distal (international) human activities are responsible for climate change impacts, evidence of low agency and a preference for external support or leadership to contend with the impacts suggest the primacy of distal attribution of cause. This is consistent with the observations on Yaqaga Island, where although human causes are equally attributable to distal (international) and proximal (local) human cause, the remaining attribution of cause is entirely accounted for by nature, an immutable distal factor.

Excerpt 9: Attribution of cause to nature on Yaqaga Island, Fiji

Dialogue A – Nature - Yaqaga Island
Interviewer: Do you think there's a link between climate change and what's happening in the sea?
Respondent: Yeah.
Interviewer: Tell me what you think are the main things?
Respondent: Like weather always changing like before, the temperature of the water like before at this stage it's usually warmer and now cold.
Interviewer: Does that affect you being able to fish?
Respondent: Yeah, we can spend only one to two hours diving because it's too cold and the fish are moving in to warmer water which is too deep.
Interviewer: Is there anything you can do about those things?
Respondent: In Fiji, I don't think so because it's all nature.

This tendency towards distal attribution of cause is also evident on Gau Island, where the population sub-set only registers God/Religion, an immutable cause (see Excerpt 10: Dialogue A – Religion – Malawai Village, Gau Island). The limited prevalence or the lack of multilayered attributions of cause and proximity among the Gau population subset is inconsistent with the expected affordances of sustained ideational exposure around comprehensive ecosystems or livelihoods-based climate change adaption initiatives. However, it appears consistent with the theoretical basis and activity culture they have been exposed to, which privileges the provision of

information on a 'need to know basis' and a granular problem-response model that eschews conventional emphasis on conservation language and principles that emphasize general information, cause and effect, impact and responsibility. While this approach is efficacious in terms of overall high knowledge levels, a high degree of consonance with actions profiled by the projects, causes and successes with community understandings and perceptions of what a climate action is, and supports my earlier observation of the significance of the rate of information provision to boost knowledge levels, there are clear limitations for recognition of actions that are highly proximal, primarily routine and domestic or distal and particularly scientific or technical.

This tendency towards proximity-based bifurcation of cause, particularly distal attribution which is evident across all three study contexts, reveals a correlation between non-identification of distal, technical and scientific climate change actions/responses, alongside distal causes and impacts on one hand, and highly proximal, particularly domestic and routine activities or actions (smokeless stoves, income generation, sanitation, water monitoring task groups etc.), and local human cause on the other hand. These dissociative bifurcations are palpable supporting evidence of the climate knowledge gaps observed in the data and suggests limits in the ideational affordances enabled by the climate change interventions associated with study populations. Theoretically, it underscores my earlier observation that the generally accepted notions underpinning the proximity thesis is in fact more complex, as it is marked by perceptual limits, largely associated with knowledge levels. However, culture may also be a mediating factor at the proximal level based on the general tendency towards perception of equal climate risk at the village level and expressions of optimism on climate change agency while offering non-committal responses on direct questioning about responsibility as a cause and for leading action across all three contexts. The latter is evidenced by the inconclusiveness of the data on local

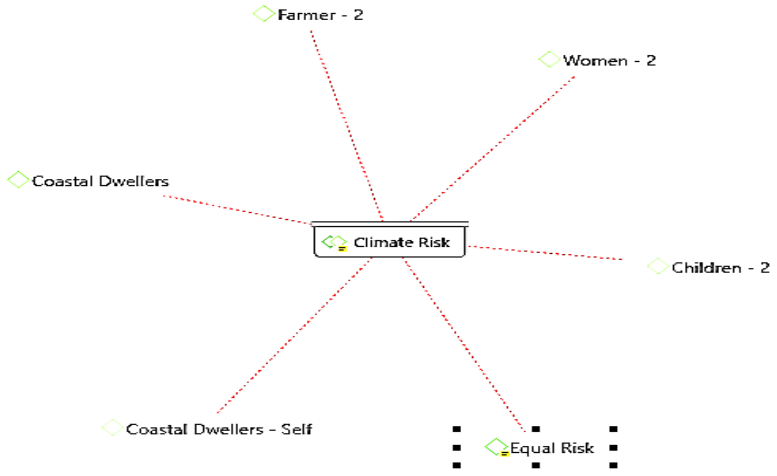
versus human responsibility in Seaqaqa. However, this is consistent with the general communal disposition of traditional societies where group cohesion is privileged.

Excerpt 10: Attribution of cause to religion on Gau Island, Fiji

Dialogue A – Religion – Malawai Village, Gau Island
Respondent: The changing of the world, the weather, the marriage, the way of the people and the looking of the land that is changing every year. That's what is meant about climate change. ***Interviewer:*** Any of those changes in your village? ***Respondent:*** I see the way of the people, in the olden time some years ago see the way the people live. I also see that past years ago there's only one religion and during this few years ago some more religion come. This religion come and separate the people this religion. Before this people like it's one God when some religious come they can't work together and what. ***Interviewer:*** So, you think that is related to climate change? ***Respondent:*** That is climate change from the church. Also, the way the people some years ago people like the people look at each other now the people don't want to; they just do what they want to do. ***Interviewer:*** So, you're saying that people just want to do what they want to do? ***Respondent:*** They don't listen to the leaders to tell them what to do. The leaders of the church, leaders of the village, the turaga ni koro they don't listen and what to do what they want to do. ***Interviewer:*** And you think that is related to climate change? ***Respondent:*** Yes. ***Interviewer:*** Is there anything in the Bible that you think to speak that out? ***Respondent:*** The Bible says in the last time and we are how as in Mathew 24:10, where many people will give up their faith and betray one another. People's love will grow cold. That shows about the last time. ***Interviewer:*** And you think climate change is the sign of the last days? ***Respondent:*** Yes, climate change is the sign of the last days.

Climate Risk

Figure 12: Climate and vulnerability risk perception in Fijian villages



The data denoting perception of vulnerability and relative vulnerabilities (self, community and livelihood) across the study population or climate risk offers textured supportive evidence for this mediating cultural factor. Climate risk is probed using six analytical units (see Figure 12) that were derived based on the data, including two layers of coastal dwellers, to differentiate between secondary identification of personal risks (Coastal Dwellers – Self, those

derived when probed) from primary invocation of personal risk (Coastal Dwellers). The data shows a dominant interpretative risk disposition, the probity of which emerging research on interpretive communities of risk strongly suggests can improve message and programme design that resonate with values and predispositions (EcoAmerica & SRI Consulting, 2006; Leiserowitz, 2005; Moser, 2007). This is particularly important as the dominance of the communal risk disposition suggests limited segmentation is required to frame the stakes of inaction for various segments of the population.

Overall, Equal Risk accounts for nearly two-thirds (see Table 21) of the prevalence of climate risk in the data. In Yaqaga, a small coastal village with a dense web of familial ties, equal risk marks the totality of the study population's perception of climate risk and showed a degree of sturdiness when probed, as highlighted by Excerpt 11, Dialogues A and B. This is consistent with the disaster risk ideation and overall high climate change knowledge and agency in the village.

Table 21: The relative prevalence of climate and vulnerability risk markers perceived across study populations in Fiji

Village	Children - 2		Coastal Dwellers - Self		Coastal/Riverside Dwellers		Equal Risk		Farmer - 2		Women - 2		Density
	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Lamiti*	0	0%	0	0%	2	17%	8	67%	1	8%	1	8%	12
Malawai*	1	8%	3	23%	1	8%	8	62%	0	0%	0	0%	13
Seaqaqa	0	0%	0	0%	0	0%	4	50%	4	50%	0	0%	8
Yaqaga	0	0%	0	0%	0	0%	5	100%	0	0%	0	0%	5
Totals	**1**	**3%**	**3**	**8%**	**3**	**8%**	**25**	**66%**	**5**	**13%**	**1**	**3%**	**38**

* Gau village

Excerpt 11: Equal Risk Perception on Yaqaga is emphasized even when probed

Dialogue A: Yaqaga Island OM FG	Dialogue B: Yaqaga Island OW FG
Interviewer: Do you think anybody is more affected or all the same? ***Respondent:*** All the same. ***Interviewer:*** Everybody agree? ***Respondent:*** Agree.	***Interviewer:*** Who or does anybody feel their groups in the village are more affected by climate change than another people or is everybody affected the same way? ***Respondent:*** All the same ***Interviewer:*** Explain further… How are people affected the same way, like now some people move further away from the sea, some people [end up being] closer… Do you (sic) think about that? ***Respondent:*** Because of the erosion there and the

	house is far away this time. We all have to carry our bag, our food, and everything far away. ***Interviewer:*** OK, so your house might be affected but it's closer? ***Respondent:*** When it's low tide over here we have to go another 100 meters to our homes.

Even in Seaqaqa, a communally atypical Fijian village (both Indo and Indigenous or iTaukei Fijians) with looser traditional bonds where specified risk attribution is higher (50 percent farmers and 50 percent equal risk), specification only emerged in individual interviews with farmers. The fact that Seaqaqa was designed as a farming community less than two generations ago and decidedly thrives as such today underscores the comparatively higher level of risk specification. While the difficulty to reconcile risk perception (equal versus particular (farming)) is indicative of the looser social bonds across the multi-enclave cane-farming settlement and is consistent with the overall significance of the knowledge gap in the community. This further underscores the importance of climate change ideation afforded by project interventions, which suggests highly targeted adaptation (and coping mechanisms) are less likely to afford. However, the significant resonance of equal risk in this context of relatively loose social ties because of the atypical ethnic and industrial construction of the settlement supports the observations drawn about the cultural and communal mediating factor.

The data pertaining to the Gau subset offers strong support for both the ideational and cultural extrapolations I have drawn. On Gau, where climate change ideation is more comprehensive, equal risk accounts for the great prevalence associated with climate risk attribution (64.5 percent), and in similar proportion across both villages (Lamiti (67 percent) and Malawai (62 percent)). The Gau population subset also reveals a broader range of climate risk perception or risk attribution, which is consistent with the ideational affordances of the comprehensive ecosystems-based adaptation intervention on the island, the high level of climate

knowledge and wide range of climate knowledge acquisition sources detailed earlier. Specifically, where the study population departs from the tendency to note equal climate risk, especially in focus groups, clear links are drawn between cause and effect that has resonance with key indicators/signs of climate change in the study area.

The risks faced by Coastal Dwellers (both levels) account for the second most important climate risk category in the study overall and in the Gau population subset (the only sub-set it figures in) with combined prevalence of 24 percent (six of 25) at the combined village level. However, respondents tend to change their answers to acknowledge their specific and disproportionate climate risk on probing in both. For instance, a half of the specification of risk faced by coastal dwellers (Climate Risk - Self) emerged in the Malawai subset after individual risk was invoked and explicitly probed by the researcher (see Excerpt 12 Dialogue A). The analytical unit, Climate Risk - Self, is therefore a secondary attribution of risk, which suggests overall communal climate risk perception on the island is in excess of two-thirds. It also underscores my observation of a tendency to focus on communal risk rather than individual risk as it is evident in both focus groups and individual interviews. It is consistent with the overall communal motive for action, a preference for communal action and the privileging of traditional structures as the chief means through which to lead on climate change.

Excerpt 12: Risk specification on Gau is secondary

Excerpt A: Malawai Older Women Focus Group	**Excerpt B: Lamiti Older Women Focus Group**
Interviewer: Who will you say in the village- which group is mostly affected by climate change? ***Respondent 1:*** This two groups? ***Interviewer:*** All the youths, men, women, fishes, farmers; is there a group that is mostly affected or is everyone equally affected? ***Respondent 2, 3, 4, 5:*** ALL Respondent 1: No, I think is everybody because the women goes out fishing and there is less, men cut down the trees. ***Interviewer:*** So, you think everybody is equally affected? ***Respondent 1:*** Yes ***Interviewer:*** So, why do you think the men are more affected,	***Interviewer:*** What do you think about climate change? ***Respondent 1:*** The change in weather now is different from the way our forefathers used to live in the olden days compared to what we are experiencing now with regards to the lifestyle and culture ***Respondent 2:*** Climate change affects us in terms of the weather in the olden days we look at the mountains we always see the soil erosion what we never experienced now is washed to the sea. The place where it is not swampy now it's swampy. The sea-weed is not good enough too dirty and less to eat that is affected by the climate. When it's a sunny day there is not much sunshine and vice versa. We always wait for [things] to happen like waiting for the sun and it never comes.

tell me it doesn't have to be one this is why it is good to have multiple people share. Tell me why you think the ladies are more affected than man? ***Respondent 2:*** When we cut down the trees. ***Interviewer:*** So, you're saying women are indirectly affected by… Any other comments. How about the people who live closer to the sea, they are more affected by those that live in land? I'm saying whose house is closer to the sea? Anyone else? ***Respondent 2:*** No, I live down here **Interviewer**: Oh, so, how many… one, two? So, you think climate change affects you more than the rest of the village? Yes? You think so? ***Respondent 2:*** Yes ***Interviewer:*** Do you think you should do more? What more do you think you can do? ***Respondent 1:*** Planting of mangroves beside the shore	***Respondent 3:*** Rain does not come regularly not like before it affects us mostly erosions are there in the mountains that affects our river, our water due to the rain and it affects the sea affecting the fish. Now the sea weeds we can't get as they have been very dirty like what Soko said. ***Interviewer:*** Who in Lamiti is mostly affected by climate change? Is affected more or the same? ***Respondent 3:*** The same ***Respondent 2:*** Mostly to the farmers because if the soil erosion and move to some other places to do their farming and is not good to locate somewhere else ***Respondent 4:*** The fishes are affected the women

Children - 2, Farmers - 2 and Women -2, also registered prevalence of four percent each (singular instances) in the data. The specification of both Farmers and Women emerged in the Lamiti (Gau Island) women's focus group (older women), where equal risk was also mentioned. Although these references appear gendered in a consequential manner (farming is a male job), both were proffered with strong food security emphasis per Excerpt 12, Dialogue B. However, these attributions differ from the specification of farmers in Seaqaqa as they are not particularities stemming from a knowledge gap or discounts the communal make-up (all families are dependent on farming and fishing). Instead, they reveal how climate change affects both genders in terms of employment/communal obligations and subsistence in resource dependent contexts. It is also articulated in a manner that is consistent with elements of their primary climate perceptions, particularly their emphasis on dwindling crop yields/soil health and fish stock**.**

Climate Change Agency

Figure 13: Forms of climate change agency in Fijian Villages

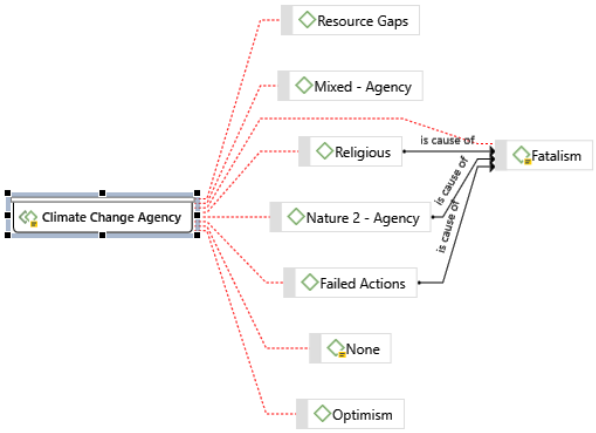


Table 22: The relative prevalence of forms of climate change agency across study populations in Fiji.

	Failed Actions		Fatalism		Mixed - Agency		Nature 2 - Agency		Optimism		Religious		Density
Village	**Prev**	**Rate**	**Prev**	**Rate**	**Prev**	**Rate**	**Prev**	**Rate**	**Prev**	**Rate**	**Prev**	**Rate**	
Lamiti*	3	10%	2	6%	0	0%	0	0%	26	84%	0	0%	31
Malawai	0	0%	1	2%	0	0%	0	0%	26	58%	18	40%	45
Seaqaqa	0	0%	8	23%	1	3%	4	11%	25	71%	4	11%	35
Yaqaga	1	6%	3	19%	0	0%	0	0%	13	81%	0	0%	16
Totals	**4**	**3%**	**14**	**11%**	**1**	**1%**	**4**	**3%**	**90**	**71%**	**22**	**17%**	**127**

* Gau village

The strong correlation between the range and nature of climate knowledge and knowledge acquisition sources, project perception and ideational exposure offered through climate adaptation initiatives across the study populations also correlates with agency. It also reinforces Lorenzoni et al.'s (2007) observation of the interrelations between individual level barriers to climate change communication and action, specifically a lack of knowledge, absence of desire to seek information and limited availability of relevant or accessible information.

Climate agency concerns the study population's perspectives on what they or others can do to limit climate change-induced impacts experienced in their communities. This study employs eight analytical units (see Figure 13) to capture the presence of agency, mixed agency, a lack of agency, and various forms/causes of fatalism (nature, failed actions and religious). While fatalism is substantial, there is no discernible climate denialism, which is consistent with the high

perceptibility and primarily existential or subsistence perceptual valence. This correlation suggests the extant literature's association between climate denialism and knowledge gaps is overdetermined in resource-dependent contexts where perceptibility and impact are substantial. Overall, 71 percent of all expressions related to climate agency are optimistic (see Table 22). This high level of optimism soars to 83 percent (90 of 108) when one accounts for an outlier in the Malawai sample pool, a transient resident pastor who accounts for the only instance of explicit fatalism and all 18 explicit references to its religious orientation. This high degree of optimism is evident across all the study populations with notable variations.

Malawai Village on Gau Island records 100 percent optimism on climate action, apart from the outlier noted above. Lamiti Village, which is also located on Gau and was exposed to the same decade-long comprehensive ecosystems-based adaption initiative, is marginally less optimistic at 84 percent (or 26 optimistic references to climate action out of 31 instances in which climate agency was invoked). The absence of agency that marks the remainder of the population also seems mutable as it is marked by fatalism caused by failed actions, which are not irreversible. With these adjustments, when combined, climate change optimism on Gau stands at 91 percent or (52 of 57).

In Seaqaqa, climate outlook is also largely optimistic with a prevalence of 71 percent, in addition to one instance of mixed agency that's attributed to nature**.** The population segment that was marked by a lack of optimism on climate action accounted for nearly a quarter of relative prevalence (23 percent), which is marked equally by fixed causes nature (four) and religion (four). This is strongly associated with the primary way through which they perceive climate change (water scarcity) and its direct relationship with nature (natural well), which is subject to a changing and variable climate.

Yaqaga Island also shows a high degree of optimism on climate action with an optimistic prevalence of 81 percent. The population marked by a lack of climate agency, specifically fatalism caused by failed actions, features in relative prevalence of 19 percent. This also correlated strongly with the signs/indicators of climate change most resonant on this island that distinguishes it from a near identical island geographical context in the Gau villages: coastal erosion and efforts over a generation to tackle it by building a makeshift seawall.

The nature of fatalism that weakens agency across the study populations is variably mutable, which is consequential for how values are interpellated in climate change interventions. Both nature and religion are interlinked domains in Fijian traditional and indigenous societies that structure the values held by the populations studied. The religious-oriented fatalism observed in Malawai Village, for instance, is very complex (see Excerpt 13, Dialogue A). It does not promote inaction but demarcates a clear limit to which action is necessary, warrants support and can or will be viewed as efficacious. In a phenomenally logical fashion, it decisively separates necessary short-term actions with direct benefits (utility) from panaceas, while linking participation with end-time preparatory rituals or duties. So, religion is not an immutable limit in this context (see Excerpt 17, Dialogue A; also see motive for action on Gau). This contrasts with the fixity that underscores religious fatalism expressed by interviewees across faith traditions (Hinduism, Christianity and traditional retentions) in the multi-ethnic enclave of Seaqaqa (see Excerpts 14, Dialogues B and C). This complexity that marks the connection between agency and religion is theoretically significant. It strongly suggests significant limits to contentions about the high efficacy of religious frames, even when tailored to faith traditions in the same religion (Kearns, 2011; Nisbet, 2009). The absence of initial and explicit immutability evident in Excerpts 13 and 17 shows that the openings that can be enabled by framing environmental

stewardship as a matter of morality and ethics, or a religious duty of care akin to Pope Francis's (2015) second Laudato Si' Encyclical "On Care for our Common Home," are conditional.

The contrast in how religion or religious disposition affects climate agency across Gau and Seaqaqa is consistent with the differences in ideational exposure, range of climate knowledge acquisition sources and knowledge levels in both contexts. Similarly, nature and nature-induced fatalism (failed actions) are variably mutable across study populations in a manner consistent with ideational exposure, range of climate knowledge acquisition sources and knowledge levels. In Seaqaqa, a context where circumscribed or limited ideation correlates with low levels of both measures noted, nature related fatalism is invoked with resignation when probed about what can be done about climate change. This retort from a participant in the Male Probing Group is emblematic, "[we] just go with the climate and right now we can only prepare the land and calmly wait for rain." Whereas, failed actions, which figure in the data for both Yaqaga Island and Lamiti Village on Gau Island, contexts with relatively and variably higher ideational experiences and range of climate knowledge acquisition sources and knowledge, are manifestly mutable blocks that can be attenuated with access to resources, technical support and improved coordination, particularly for Yaqaga (see Excerpt 15, Dialogue D).

Excerpt 13: The mutability and complexity of religious oriented fatalism observed in Malawai Village

Dialogue A: Religious Fatalism – Malawai Village, Gau Island
Interviewer: So, you say climate change is the sign of the end time? ***Respondent:*** Yes ***Interviewer***: So, you see climate change is the sign of the end times but there is lot of work going on in the village. Do you think this is something we can do anything about? ***Respondent:*** Yes ***Interviewer:*** We can still do something about it even though it's a sign of the end times? ***Respondent:*** Yes ***Interviewer:*** If climate change is a sign that [the] world is going to end, can we still do something about it? What can we do? ***Respondent:*** Do the what?

Interviewer: Climate change is a sign of the world's end and Joeli has this project where you planting *tiri*, building seawalls. Does it make sense?

Respondent: Yes

Interviewer: Will that stop it?

Respondent: It doesn't

Interviewer: It's going to happen so you do it because some help, some benefits

Respondent: Yes

Interviewer: Are you involved in the building of the sea-wall?

Respondent: I'm involved

Interviewer: OK, and you plant *tiri* as well?

Respondent: Our task is to do that but the day will come

Interviewer: So, you do it because if something happens to the village?

Respondent: Yes, to protect the village now and nothing in this world can stop

Interviewer: OK that is what I was thinking of. Thank you! thank you! Do you talk to your congregation about this?

Respondent: Yes

Interviewer: What are their reaction? Like did they agree with you or…?

Respondent: Agree. I told them what they have to do every day and most thing they have to is to prepare ourselves for the end.

Interviewer: They'll help with the things. You saying something what is it?

Respondent: The task I told them every day to do, their spiritual growth they must prepare for the last days their movements.

Interviewer: Do you think people or Joeli understands it from the view of the Church? Have you talked to him about this- the villagers view on climate change?

Respondent: Yes, he also knows.

Excerpt 14: The immutability and fixity of religious fatalism expressed in Seaqaqa across faith traditions.

Dialogue B: Religious (Hindu) Fatalism – Older Male Focus Group – Navai, Seaqaqa	**Dialogue C: Religious (Christianity/ Traditional Retentions) – Male Focus Group – Rokosalase**
Interviewer: Do you think we can do anything about it? ***Respondent 2***: No ***Interviewer:*** Why? ***Respondent 2:*** Because it's in God's hands and we cannot do anything about it. ***Interviewer:*** Do you talk about climate change in your various churches, temple? ***Respondent 2:*** Yes	***Interviewer:*** Why can't you do anything about climate change? ***Respondent 1:*** Everything is up to God

Excerpt 15: The mutability of fatalism induced by nature and failed actions on Yaqaga Island.

Dialogue D: Nature and Fatalism – Older Men Focus Group – Yaqaga Island
Interviewer: So, you guys are doing something about the sea wall that you build. When do you build the sea wall? ***Respondent:*** Back in the 1980's ***Interviewer:*** Is it a community thing? ***Respondent:*** We're all part of the project, we built the stone ***Interviewer:*** What I'm trying to find out is that the Government started the project or the village ***Respondent:*** The village ***Interviewe****r:* Because of the erosion? ***Respondent:*** And the climate change knowledge just came in now ***Interviewer:*** You learn about climate a long time ago. How do you describe it at that time of the building of sea wall back in the 80's? ***Respondent:*** Right from the shoreline to the front ***Interviewer:*** They say move the stones from where? ***Respondent:*** They move the stones back to its original place; they move it over there and they see it was not that effective. The shoreline now regrow back so they move it closer to the village. ***Interviewer:*** Oh, they are trying to get back and reclaim the land so that was working? So, it is to protect what you have? ***Respondent:*** Yes ***Interviewer:*** This is done ever since? ***Respondent:*** Yes, it is done every Monday. ***Interviewer:*** What is it that you do every Monday? ***Respondent:*** Collecting rocks ***Interviewer:*** Did you do it in groups? ***Respondent:*** Men, women, children ***Interviewer:*** Nice. And this was all way back in the 80's? And what did you call when you were doing it then term it as building of seawall? ***Respondent:*** I was there when they build ***Interviewer:*** What did they call it then seawall? ***Respondent:*** We were building sea wall then; you know all those big trees on the right those are right on the shoreline but now they are like islands. ***Interviewer:*** My next question is if climate change is something you can do something about, you clearly think the Community has been a lot of really interesting things. Do you think climate change is something you can do something about? What I'm trying to find out is [if you think] what you're doing will stop it, limit it or help you survive it- climate change? What do you think? Are you doing it to cope for now or the things you are doing will stop it? ***Respondent:*** To adjust to the changes we can't do anything to the changes in climate ***Interviewer:*** What about fishing? Do the way you fish has anything to do with climate change? You said yes? Why? Why? What's the link between you fishing and climate change? So, you fish right

and I'm trying to find out if there's a connection between climate change and fishing?

Respondent: We used to fish there but now we go far away

Interviewer: So, you think climate change is causing that? What is it of the shores that is forcing you to move away? So that's something missing from your shores that's making you shift where you fish. Did you have any idea of what that is?

Respondent: That is where the baby of the fish

Interviewer: What is making the sardines migrate?

Respondent: Because of the net, we overfish the sardines.

Respondent: It also shifted to the outer islands like Yadua, it should be near here.

Motive for Action

However, considering the high level of agency across study populations (decidedly majoritarian to maximal), even in Seaqaqa where ideational exposure, climate knowledge levels and acquisition sources are relatively lower, a closer look at why people participate in or care about acting on climate change is crucial to improving understanding of the tapestry of factors that structures, and may be leveraged to boost climate agency. In other words, probing the data for the study population's motives for acting on climate change, currently or prospectively, warrants scrutiny.

Figure 14: Intrinsic and extrinsic factors that motives climate action in Fijian villages

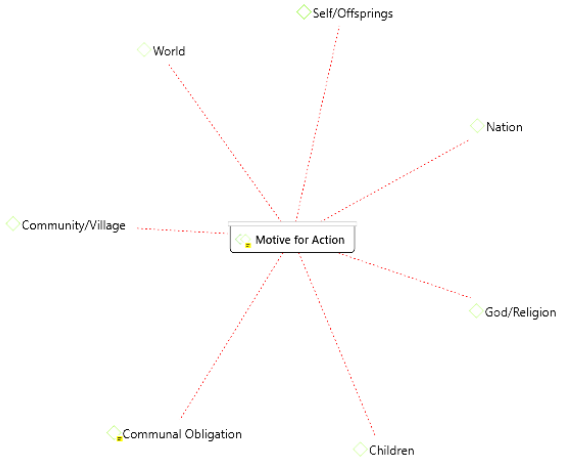


Table 23: The relative prevalence of Intrinsic and extrinsic factors that motives climate action across study populations in Fiji

Village	Children		Communal Obligation		Community/ Village		God/Religion		Self/ Offsprings		Density
	Prev	Rate	Prev		Prev		Prev		Prev		
Lamiti*	4	44%	0	0%	6	67%	1	11%	0	0%	9
Malawai*	6	25%	1	4%	8	33%	7	29%	2	8%	24
Seaqaqa	0	0%	0	0%	3	100%	0	0%	0	0%	3
Yaqaga	0	0%	0	0%	2	100%	0	0%	0	0%	2
Totals	**10**	**26%**	**1**	**3%**	**19**	**50%**	**8**	**21%**	**2**	**5%**	**38**

* Gau village

Using seven analytical units derived from the dataset to capture both intrinsic and extrinsic factors that motivate action (see Figure 14), the preservation of the community emerges as the main motive for acting on climate change across the study population, accounting for half of the prevalence associated with all seven factors denoting motive for action in the overall study population. However, the significance of this motive is marked by distinct complexity on Gau Island, which is consistent with their sustained ideational exposure to comprehensive climate change adaptation activities.

While the data suggests a single factor (community/village) motivates action on Yaqaga Island and across the Seaqaqa settlement, three factors motivate the population on Gau Island (see Table 23). These are community/village, children and religion, which account for combined village totals of 42 percent (14 of 33), 30 percent (or 10 of 33) and 24 percent (eight of 33), respectively. The fact that the analytical unit children is distinct from that which captures references to one's own children means this is an expansive outlook. It is independent of but intimately linked with the general communal disposition. It suggests empathy and care for others, particularly the young, is an operative factor. Taken together, it shows a communal motive with a prevalence of nearly three-quarters (73 percent or 24 of 33). So important is the communal motive that one respondent, who registered agency framed with religious conditionalities (distinct from religious fatalism), cited communal obligation as her motive for action (see Excerpt 17, Dialogue A). This offers further support for my earlier observation of the

complexity of religious values in a context where ideational exposure, climate knowledge and knowledge acquisition sources are high. Also, when read in context, the six percent prevalence (two of 33) attributable to the preservation of self/offspring, which is found in the data associated with the older women in Malawai Village, is found to be secondary and connected to expressions of communal preservation.

The high prevalence of the communal motive across all three study populations supports my earlier reading of how the duty bound or communal disposition in indigenous Fijian communities—where traditional structure, seniority and authority are privileged such that a lack of youth-specific consultation—masks limited youth inclusion in and influence over decision-making processes about climate action, particularly on Gau Island. This suggests climate action decidedly focused on 'the whole' is likely to find greater support in these contexts. However, the gendered and age-based division of labour and routine tasks, which are perceptibly impacted by climate change in variable ways, strongly suggests that group specific integration into project decision-making should transcend the limited macro-group (male and female) formation—observed to varying degrees across the three study populations, to include youth, as detailed in the subsection on macro-group variations across the field sites. This is so as tasks and roles are gendered and undifferentiated across families in each context, so with male and female adult inclusion already variably accounted for across projects, youth, who have designated duties based on their age in traditional and indigenous Fijian society, in addition to their gendered duties, is a missing macro group in the decision-making processes. So, providing subject-matter or task-specific information (fishing, farming, sanitation, etc.) to age-based gendered cohorts and specifically including each group in the decision-making processes—rather than only project activities—taps the highly resonant communal motive observed, including risk perception and is

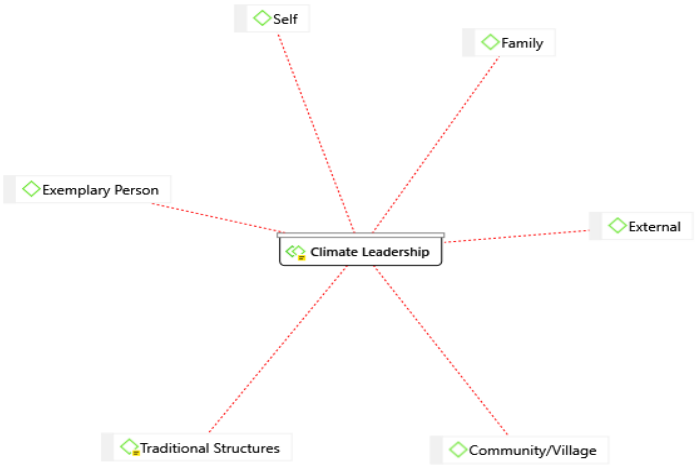
likely to boost both knowledge levels and agency and invariably, other factors such as project perception. The salience of this point is illustrated in the subsection on the range of salient gender and age macro-group variations observed in the dataset that is indicative of gaps across various critical dimensions.

Excerpt 16: The potency of communal obligation in Malawai Village militates religious-oriented fatalistic impulses

Dialogue A: Motive for Action – Religion and Communal Motive – Young Women Focus Group – Malawai Village, Gau Island
Interviewer: How did you learn about climate change? ***Respondent 2:*** Based from the Bible- Mathew 24 talks about climate change ***Respondent 1:*** Before ***Respondent 3 & 4:*** Same ***Interviewer:*** Your education system talks about climate change? Do you think you can do something about climate change? ***Respondent 2:*** The time will come and we have to face it. I just learn from that. ***Interviewer:*** You three said that you can do something about it? ***Respondent 4:*** I believe we have to plant more mangroves and don't throw garbage into the sea. Sometimes we use small nets to catch small fish and wait for high tide to catch big fish. Some use fish poisoning because it is easy to kill the fish instead of standing for long hours waiting to catch a fish. ***Interviewer:*** So, people still use that now? ***Respondent (ALL):*** NO! ***Interviewer:*** What do you think people use fish poisoning? ***Respondent 2:*** To kill the fish ***Respondent 4:*** They don't think of others they just think about themselves. ***Interviewer:*** so selfish? Do you know anybody using that? ***Respondent 4:*** Too many to mention but I just can't say it ***Interviewer:*** Can you tell me about the activities in the village, the trees you've plant? ***Respondent 4:*** Our husbands are building seawalls and we're planting mangroves. ***Interviewer:*** So, the men don't plant mangroves? ***Respondent 3:*** Sometimes ***Interviewer:*** So, women don't work in building sea walls? ***Respondent (All):*** NO ***Interviewer:*** So, you think change is inevitable- you plant the mangroves, don't use poison and small nets to catch fish and climate change. Why do you think it is inevitable, and doing things to limit? You told me earlier the bible says about climate change and you are still doing things? Why [do] you still do [those] things? Why [are] you still fishing properly, planting the mangroves? ***Respondent 2:*** I follow what [Respondent 3] said I go and plant. It is required on what Joeli [project lead, Dr. Joeli Vietayaki} says.

Climate Change Leadership

Figure 15: The preferred sources of leadership on climate change in Fiji villages.



Consistent with the high resonance of a communal motive for acting on climate change and risk perception, the study also shows a high preference for communal leadership on the multi-faceted issue of climate change. Of the six analytical units denoting the individuals or groups in which they prefer to repose leadership on climate change issues (self, exemplary person, family, community/village, traditional structures and external entities – see Figure 15), the data suggests the study populations overwhelmingly privilege climate action through traditional structures. In iTaukei contexts such as Gau and Yaqaga Islands, these structures include *turaga ni koros* (official village headmen), traditional village chiefs (head of the chiefly *mataqali* or clan) and in the atypical settlement of Seaqaqa, this includes an advisory counselor, which is similar to the turaga ni koros. In all three contexts these structures also include various village committees.

In Lamiti Village, the preference for traditional structures is decisive, with a prevalence of 60 percent compared to the other factors (see Table 24). Although these structures are also privileged in neighbouring Malawai, there is preference for more varied leadership: 43 percent

prevalence for traditional structures and 38 percent for a more devolved community/village-wide approach. However, when taken together, community/village wide leadership on climate change and climate action through traditional structures accounts for 90 percent and 81 percent of the preferred leadership channel for climate actions in the Gau villages of Lamiti and Malawai, respectively. These communal avenues for action (an average of 85 percent thematic prevalence or 35 of 41) dwarf the marginal prevalence of external entities, which was only invoked once alongside communal, family and traditional structures and family and self as the preferred leaders on climate action. The emphasis on the communal channels of leadership on climate change conforms with both communities' angst about the resilience of traditional structures amidst socio-cultural changes and the Gau Island project's emphasis on mobilization, action and ownership through these domains. It also strongly correlates with the high level of positive project perception and perception of influence and inclusion in the process.

Table 24: The relative prevalence of preferred sources of climate leadership across study populations in Fiji.

Village	Community/ Village		Exemplary Person		External		Family		Self		Traditional Structures		
	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Density
Lamiti*	6	30%	0	0%	1	5%	1	5%	3	15%	12	60%	20
Malawai*	8	38%	0	0%	0	0%	4	19%	0	0%	9	43%	21
Seaqaqa	3	17%	3	17%	5	28%	0	0%	0	0%	7	39%	18
Yaqaga	2	33%	0	0%	1	17%	1	17%	0	0%	3	50%	6
Totals	**19**	**29%**	**3**	**5%**	**7**	**11%**	**6**	**9%**	**3**	**5%**	**31**	**48%**	**65**

* Gau island

The data for Yaqaga Island, which is as culturally akin to Gau as it is geographically identical, also shows a similar preference for traditional structures and community/village (83 percent combined prevalence) as the primary domains in which climate change leadership should be reposed. At a more granular level, the preference for traditional structures accounts for half (three of six) of the prevalence associated with markers of climate leadership among the study population, while the preference for community/village level leadership accounts for one-third (two of six). However, the singular invocation of a preference for external leadership in Yaqaga

is of statistical significance (17 percent), and seems to correlate with the relatively higher presence of fatalism caused by failed actions (climate agency) that, as established earlier, is not immutable given access to expert intervention, specifically the generation-long effort to build a makeshift seawall to stave-off coastal erosion (a key sign/indicator of climate change, among the population) that is yet to yield the outcomes desired (see Excerpt 15: The mutability of fatalism induced by nature and failed actions on Yaqaga Island, Dialogue D).

Although much lower, even in Seaqaqa, which is culturally distinct and atypical in Fiji because of its diverse ethnic composition and origin as a product of a deliberate government agro-economic policy, there is strong evidence of a preference for action through communal/village level and traditional structures—specifically their advisory counselor, who is appointed by the regional authorities based on self-nomination from a resident of the community and the assent of the community. Overall, both communal domains have a prevalence exceeding a half (56 percent). The community also shows a strong desire for external leadership (28 percent prevalence) and leadership by exceptional individuals locally and externally (17 percent prevalence) accounting for a combined 45 percent prevalence (eight of 18) associated with leadership preference. The absence of the self or kin nomination (family) registering as a preference suggests the outward look, which is comparable to the confidence reposed in communal leadership, is an expressed interest in tapping expertise not found within their place of abode to tackle their acute climate change induced challenges, particularly water scarcity and low crop yield (per signs and indicators).

This granular look at how and where climate change leadership confidence is reposed strongly confirms the importance of communal level interventions with cross-macro social group resonance and invariably sectoral peculiarities given the gendered and age-based division of

labour. More importantly, it also makes manifestly clear the importance of acknowledging and leveraging traditional and communal leadership to ensure compliance and effective climate adaptation, a point also supported by varied discrete age and gender observations in circumscribed settings as detailed in the subsection on macro-group dynamics. This would also necessarily promote communal harmony, which invariably boosts both perception and overall success. This observation is consistent with those of indigenous scholar Joeli Veitayaki, who notes:

> Traditional leaders are born into positions of leadership and must lead, so that decision making is consistent with the need for resource management. The work in Vanuaso Tikina was easier because of the support of the chiefs who have been pillars of strength. Long term community support will only be assured if the leadership is fair, transparent and inspirational, (Veitayaki, 2001, para. 10)

Crucially, it also highlights the need to enhance the efficacy of these communal leadership structures by accounting for contextual factors, such as technical, monetary, informational and logistical support, that undermines both agency and confidence in the communal as observed in both Yaqaga Island (failed actions) and Seaqaqa. This is underscored by my earlier observation of the specification of Dr. Veitayaki's status as Kai Malawai alongside his technical competence by respondents on Gau (see Excerpt 1, Dialogue A), which portends well for equipping and privileging local champions and messengers on climate action as technical leaders rather than mere functionaries for the diffusion of messages across mediated networks.

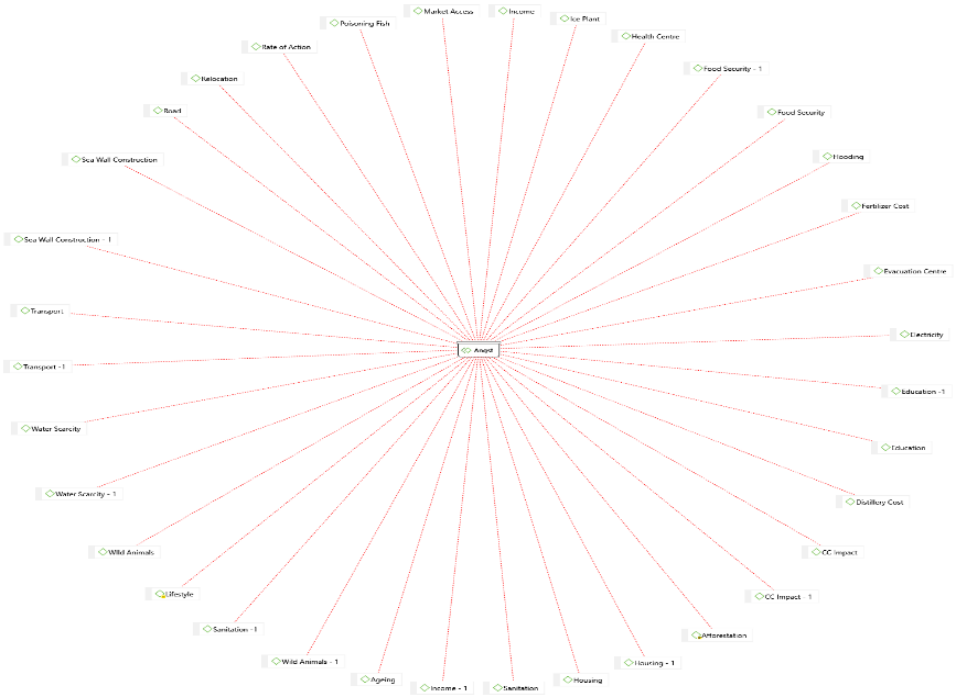
Angst: Complex Challenges

The data suggests that accounting for these technical, monetary, informational and logistical deficits, as well as gaps in macro-social group inclusion in decision-making and invariably multi-linked sectoral and task emphasis, is necessary to improve climate knowledge and enable communities to better identify, support and/or conceptualize and implement climate actions. The complexity and linkages among the broad array of issues identified as key community challenges (angsts), difficulties among segments of the study populations to recognize their connection with and rank them against climate change as a primary challenge underscores this observation. This is especially important as expressions of angsts have a high prevalence in the dataset, such that the 35 analytical units used to gauge the issues of greatest concern to the study population is the most expansive set in this study (see Figure 16). So intractable and cross-cutting are these concerns that for analytical purposes, they necessitated isolation from signs and indicators, and other thematic groups.

Ten of the analytical units denoting angsts are illustrative of those ranked first relative to climate change by the study population. Theseare: Climate Change Impact - 1, Education - 1, Food Security -1, Housing - 1, Income - 1, Sanitation -1, Sea Wall Construction - 1, Transport - 1, Water Scarcity - 1 and Wild Animals – 1 (see Figure 16 analytical units, and Table 25 for relative prevalence). While angsts vary widely across study populations and the study sought to capture how participants perceived them in relation to climate change and the impacts it induces, it is notable that overall climate change impact independently shows the greatest level of prevalence of all angsts (prevalence of 12 of 126). However, it comes in second (alongside education) behind transportation as the angsts people deemed most important when ranked. While this macro picture varies greatly across villages, it is important to note that the study

population generally sees angsts as climate change induced or exacerbated, including access to education and transportation. As such, expressions of angsts in this context can be understood as conscious reflection on challenges and prioritization for action.

Figure 16: The range of complex concerns in Fijian villages



Consistent with the observation that the ideational affordances of the sustained exposure to a comprehensive ecosystems-based adaptation intervention on Gau Island is a differentiating factor, though the number of angsts expressed in each study population is similar (Gau - 15, (variably in each village), Seaqaqa - 12 and Yaqaga Island - nine), the Gau subset accounts for five of the six instances in which the study population prioritize climate change impact as the chief challenge—Yaqaga accounts for the sixth, which is consistent with its direct exposure to coastal erosion and the dominance of that impact as a sign/perception of climate change.

Sanitation (eight), Lifestyle (seven) and Housing (five), which account for the other statistically significant angsts on Gau, though pertinent to the viability of the study population, are rarely ranked above climate change as a key angst: housing and sanitation both registering a priority ranking once, alongside income. This separation of manifestly and latently linked angsts from climate change among the Gau subset is consistent with the higher degree of climate change knowledge in that study population and their comparatively greater exposure to the complex linkages between their lived experiences and climate change induced impact. This likely affords them the ability to draw linkages when probed about the order of importance of their angsts, notwithstanding a tendency to use proximity as a factor in initial associations between impacts and action relative to climate change.

This thesis also holds true with the Seaqaqa population. Consistent with the observation that the manifest link between the most primary way in which the Seaqaqa population observes/perceives climate change (water scarcity) and the proximity thesis, water scarcity and climate change impact feature as the two primary angsts, but of the two analytical units, only water scarcity, which impacts daily routines (proximity to the home/self), is ranked as a top problem (prevalence of nine). But, given the established ideational and knowledge gaps discussed earlier, this is likely indicative of a dissonance between cause and impact among the Seaqaqa study population. This is especially notable, as I have contended, because of the manifest relationship between their primary angst (as well as sign/indicator of climate change) and the general problem of climate change. However, the proximity thesis is reinforced by the fact that though climate change impact is noted as a central problem (specification, not rank) with a prevalence of five, a rate greater than in any single village on Gau (three in Lamiti and

four in Malawai), it is not ranked above any of the other specified challenges, which are more vividly linked to climate change, but more distally so: transport (two), food security (one).

Though Yaqaga Island is the only study population subset other than Gau to show any prevalence for climate change impact as the top ranked angst, it does not explicitly feature in their top three angsts. Education (four), health centre (three), transport (two) and sea wall construction (two) account for the most grounded/prevalent angsts in the population subset. However, when probed, all these challenges/angsts are justified by the unpredictability of the weather and the varying social costs it induces (see Excerpt 18, Dialogue A). Consistent with the observation that ideational affordances boost climate change knowledge and capacity, as evident in this study population's exposure to a broad-based disaster risk education exercise, the village only ranks its transportation (two) and educational angsts above climate change impact (four) when asked to compare their angsts because of immediacy and risk perception, as the links between the range of angsts expressed and climate change are relatively well understood.

The prominence of education as an angst among the study population is consistent with the high score it received on the Infrastructure Prioritization Index that was constructed based on the project directed community risk assessment conducted in November 2013. Its reoccurrence as an angst is highly significant. Due to the limited resources of the circumscribed project intervention, the community and project team were compelled to pursue needs prioritization. While relatively progressive for discounting voting and privileging consensus based on ideation, needs prioritization still truncates people's fundamental needs/angsts. So, while children explicitly figure in the need prioritization process and underpin the transportation and education angsts observed in my data, the village had to make them secondary because only one thing could be ranked first in each category (economic, social and coastal and water infrastructure) and

receive funding from the project. To bridge this obvious divide, the project declared the first ranked and funded infrastructure was a multi-purpose building/evacuation centre—a single room, albeit large—that it proposed for use as a classroom and a community hall when not needed as a disaster shelter. While this makes for excellent project reporting to a project donor, the lack of follow-on resources or support to realize the possibilities or expansive leveraging opportunities created by this circumscribed intervention remains unfulfilled and a source of primary angst. The larger implication here is that piecemeal or circumscribed interventions can undermine climate change agency and project perception when adaptive capacity is segmented through ranking or voting procedures to render them fundable. It reinforces the need to and efficacy of addressing climate adaptation as a complex challenge rather than a discrete phenomenon. This invariably means establishing partnerships and/or working with communities to articulate how, where and with whom to collaborate to establish linked actions, where resources (project cycle, funding, staffing, among others) preclude comprehensive responses by a singular entity or project.

Excerpt 17: Angsts are complex and intricately linked with climate change

Dialogue A: Angst – Education vs Climate Change – Older Male Focus Group – Yaqaga Island
Interviewer: Apart from climate change what are some of the problems, issues in the village with work, the challenges in the village? No other problems? Could be anything? Think about the problem here that will make life easier here. ***Respondent 1:*** School, health centre and the transport ***Interviewer:*** When you wake up tomorrow which one will you put as number 1, you think school is a bigger problem? ***Respondent 1:*** School our kids needs to start from kindergarten ***Respondent 2:*** Like for now here the weather is good, when the weather is not friendly they will stay at home till Wednesday.

Table 25: The relative prevalence of the range of ranked and unranked complex concerns across study populations in Fiji.

Village	Afforestation		Ageing		CC Impact		CC Impact -1		Distillery Cost		Education		Education -1		Totals
	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Lamiti*	0	0%	1	3%	3	10%	0	0%	0	0%	2	6%	1	3%	31
Malawai*	1	3%	0	0%	4	11%	5	13%	0	0%	1	3%	1	3%	38
Seaqaqa	0	0%	0	0%	5	14%	0	0%	1	3%	0	0%	0	0%	35
Yaqaga	0	0%	0	0%	0	0%	1	5%	0	0%	4	18%	4	18%	22
Totals	**1**	**1%**	**1**	**1%**	**12**	**10%**	**6**	**5%**	**1**	**1%**	**7**	**6%**	**6**	**5%**	**126**

Village	Electricity		Evacuation Centre		Fertilizer Cost		Flooding		Food Security		Food Security - 1		Health Centre		Totals
	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Lamiti*	0	0%	2	6%	0	0%	0	0%	2	6%	1	3%	0	0%	31
Malawai*	0	0%	0	0%	0	0%	0	0%	1	3%	0	0%	0	0%	38
Seaqaqa	2	6%	0	0%	1	3%	1	3%	2	6%	1	3%	0	0%	35
Yaqaga	0	0%	0	0%	0	0%	0	0%	1	5%	0	0%	3	14%	22
Totals	**2**	**2%**	**2**	**2%**	**1**	**1%**	**1**	**1%**	**6**	**5%**	**2**	**2%**	**3**	**2%**	**126**

Village	Ice Plant		Income		Income - 1		Lifestyle		Market Access		Poisoning Fish		Rate of Action		Totals
	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Lamiti*	0	0%	3	10%	1	3%	0	0%	0	0%	0	0%	1	3%	31
Malawai*	0	0%	2	5%	0	0%	7	18%	1	3%	1	3%	0	0%	38
Seaqaqa	0	0%	2	6%	0	0%	1	3%	0	0%	0	0%	0	0%	35
Yaqaga	1	5%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	22
Totals	**1**	**1%**	**7**	**6%**	**1**	**1%**	**8**	**6%**	**1**	**1%**	**1**	**1%**	**1**	**1%**	**126**

Village	Relocation		Road		Sanitation		Sanitation -1		Sea Wall Construction		Sea Wall Construction - 1		Totals
	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Lamiti*	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	31
Malawai*	0	0%	0	0%	8	21%	1	3%	0	0%	0	0%	38
Seaqaqa	1	3%	3	9%	0	0%	0	0%	0	0%	0	0%	35
Yaqaga	0	0%	0	0%	0	0%	0	0%	2	9%	1	5%	22
Totals	**1**	**1%**	**3**	**2%**	**8**	**6%**	**1**	**1%**	**2**	**2%**	**1**	**1%**	**126**

Village	Transport		Transport -1		Water Scarcity		Water Scarcity - 1		WIld Animals		Wild Animals - 1		Totals
	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Lamiti*	3	10%	4	13%	1	3%	0	0%	4	13%	2	6%	31
Malawai*	3	8%	1	3%	0	0%	0	0%	1	3%	0	0%	38
Seaqaqa	0	0%	2	6%	4	11%	9	26%	0	0%	0	0%	35
Yaqaga	2	9%	2	9%	1	5%	0	0%	0	0%	0	0%	22
Totals	**8**	**6%**	**9**	**7%**	**6**	**5%**	**9**	**7%**	**5**	**4%**	**2**	**2%**	**126**

Macro-Group Variations: Varied Age and Gender Dynamics

While the preceding observations offer insight into overarching approaches to boost climate agency, knowledge levels and action, the data suggests substantial fissures in macro-social group inclusion in decision-making, as well as varied, pronounced group distinctions (primarily age and gender, but also ethnic in Seaqaqa) across multiple critical dimensions that reinforce the need to provide subject-matter or task-specific information (fishing, farming, sanitation, etc.) to age-based gendered cohorts and specifically including each group in decision-making processes rather than only physical project activities and enforcement. A closer look at

varied significant gaps across these cohorts reveals discrete population segments in need of differential information and engagement (formal and informal) in these contexts in order to effectively boost knowledge levels, agency, motive, action and other factors such as project perception. The macro-group data referenced below is outlined in the respective field site macro-group appendix (See Appendix H.1 to H.12, I.1 to I.12 and J.1 to J.12 for macro-group data for Fijian projects on Gau Island, Yaqaga Island and Seaqaqa, respectively).

For both Gau and Yaqaga islands, which were both exposed to multi-sectoral climate adaptation initiatives, the data related to knowledge levels and signs perceived offers significant support for the provision of subject-matter or task-specific information (fishing, farming, sanitation, etc.) to age-based gendered cohorts. On Gau, the data shows maximal levels of positive perception of personal inclusion and influence in the project for all groups, except for young men who account for the entirety of other perceptual markers along discrete communal lines. Those in Malawai only report a lack of youth consultation with discernible level of disengagement, while their peers in Lamiti only report neutral perceptions. Consistent with the importance of project intervention in structuring climate knowledge, this cohort is the least knowledgeable on Gau, with knowledge gaps accounting for the totality of their knowledge markers, whereas it only accounts for a quarter for young women, only 17 percent for older men and zero for older women. Women, particularly older women (88 percent) show more climate knowledge as a posteriori accounts for 83 percent of their knowledge markers (88 percent for older women and 75 percent for younger women), whereas it only accounts for 59 percent of older men and zero for younger men. So, while there is no conclusive gendered or age division in knowledge, young men are decidedly more in need of targeted edification and inclusion in climate change adaptation intervention in this context.

A similar pattern is evident on Yaqaga. While the data shows no clear indication of older women's processing of climate change information that is manifestly indicative of climate knowledge, their direct involvement in the project and keen insights into non-project related and distal efforts, such as attempts at building a makeshift seawall for almost two generations, strongly suggest a considerable degree of experiential and likely a posteriori knowledge. No other cohort mentioned this development without prompting. Of the remaining cohorts, young men demonstrate the greatest degree of knowledge gap, with the indicator accounting for the totality of relative prevalence for knowledge, compared to zero for older men and just a third for young women. A posteriori knowledge, the only other indicator for the subset, is dominant for both young women (two-thirds) and older men (maximal) relative to all other possible indicators of knowledge.

Attenuating these knowledge gaps and broadening existing knowledge levels in discrete cohorts is underscored by direct associations with perceptions of signs and indicators. On Gau, signs and indicators are strongly gendered in a manner consistent with the division of labour. Signs associated with the sea (coral health, fish stock and sea-level rise), the domain across which women perform routine sourcing of protein and seaweed, are more readily cited by women. Women account for five of six invocations of coral health at similar levels across cohorts (3:2, in favour of older women) and the sign accounts for similar levels of prevalence for each cohort relative to the range of other signs they perceived (10 percent versus nine percent, respectively, compared to 0.001 percent for older men and zero for younger men). Similarly, Fish Stock accounts for a greater share of the signs perceived by women than men (25 percent versus 16 percent). Conversely, men cite signs associated with the domain of the land (coastal erosion, crop yield/soil health and soil erosion) where they are tasked with farming primarily for

subsistence and building and maintaining structures. Older men, in equal measure across the two villages, account for all but one reference to coastal erosion on Gau.

Similarly, while crop yield/soil health accounts for nearly a third (28 percent) of all signs mentioned by men, it represents under a tenth of those cited by women. This gendered distinction is evident across age-cohorts, where it is four times more resonant among older men than older women (29 percent versus seven percent), and two and half times more resonant among young men than young women (33 percent versus 13 percent). While the data suggests a marginal age correlation in favour of elders (24 percent versus 21 percent), this is inconclusive as older men account for the majority of prevalence associated with the sign, while older women account for the least. A similar pattern is observed with soil erosion, where men account for 70 percent of all references to this sign and a greater share of the signs they perceive relative to others compared to any other cohort (14 percent compared to 10 percent), both older men (14 percent) and younger men (13 percent) outpace their female counterparts (older women 10 percent and younger women nine percent) in terms of prevalence relative to other signs perceived.

On the other hand, health, usually the concern of elders, is distinguished by an age and gender marker, as the entirety of the sign is accounted for by older men across both villages. Similarly, when taken together, climate and weather, which have no particular gendered dimension or differentiated consequence, show no conclusive age and gender correlation. Women are marginally more likely to cite these combined signs (24 percent compared to 19 percent) and both older women (27 percent compared to 20 percent for men) and young women (21 percent compared to 13 percent for young men) outpace their male counterparts in terms of

the sign's prevalence relative to the others they perceive, but the similarly in resonance across all cohorts, except young men undermines the salience of this correlation.

In furtherance of the case for cohort-specific information provision, climate actions cited by the study population conforms with the macro groups most likely to be engaged in leading them across various gendered and aged cohorts. Male oriented actions such as planting trees, cultivation of sandalwood and the management of the taboo or no take area are entirely accounted for by men, primarily older men. However, in some instance, such as crop diversification and sandalwood, the prevalence is entirely associated with older men in Malawai Village, who have been directly engaged to pilot these efforts. While young men do not account for any prevalence associated with those two stated actions and only account for a single mention of planting trees and tiri-planting, the prevalence associated with tiri taboo/no take accounts for a greater share of the actions they cite than older men (one-third compared to 17 percent, zero for women). Similarly, seawall construction accounts for a greater share of the actions they note (44 percent) than it does for any other group (33 percent for young women, 20 percent for older women and 15 percent for older men). While there is no definitive gendered distinction as there is only marginal difference between the share of overall actions—sea wall accounts for comparable levels across both genders (25 percent women and 19 percent men), as older women outstrip men while younger men outstrip young women—there is a very clear age distinction on perceptions of seawall construction as a climate action (youth 41 percent compared to 15 percent for elders). The higher prevalence of both tiri planting and taboo/no take climate actions relative to other signs mentioned by young men, compared to other cohorts on Gau, is consistent with both the youth and male dynamic that marks these tasks. This can be accounted for by the overall gendered division of tasks that renders these actions male duties: the physical labour-intensive

nature of both activities and security implications associated with patrolling on the coasts renders them primarily suitable for younger and fitter labourers.

Unlike Gau, there is no clear gendered or age correlation between the relative prevalence of signs perceived and customary duties on Yaqaga, primarily because of the circumscribed and communal nature of the climate change intervention that neither engaged with or functionally leveraged and reinforced communal gendered division of labour. While fish stock, which is directly associated with women's routine fetching of protein for daily sustenance, accounts for a quarter of relative prevalence for all indicators perceived by women, decisively more than the less–than-tenth associated with men, older men (12 percent) and women (14 percent) have comparable levels of relative prevalence on this indicator. And though the data suggests a youth tilt, this is only associated with young women, for whom fish stock is their primary indicator, accounting for a third of all the signs they observe.

Similarly, while, crop yield and coral health account for a third more of relative prevalence for men than women, these are entirely associated with older folks and while the former is associated with the male domain of work, the latter is linked with the female domain (at least for routine tasks). But, the data confirms the observation on Gau that climate actions cited by the study population conforms with the macro groups most likely to be engaged in leading them across various gendered and aged cohorts. This is palpable even as young men and older women account for the totality of climate actions observed in the dataset for Yaqaga Island, none of which are directly associated with the project. The taboo/no take activity, which is a primarily young male task due to the physical risks and intensity involved in the patrolling, accounts for the totality of actions observed by young men, whereas it accounts for two-thirds for older women. The ongoing two-generation long effort to build a makeshift seawall accounts for

the remainder of relative prevalence for older women. So, both an age-based gendered involvement and an age-based experiential variable marks the distinctions observed, respectively.

In Seaqaqa, the associations regarding signs vary across age, gender and ethnic cohorts but at comparable levels, except for young men who, even in this context of knowledge deficiency, are particularly disadvantaged. But, this consistency in the resonance of signs across the cohorts at comparable levels is consonant with the low levels of climate knowledge among the study population, which precludes them from conceiving of the climate adaptation activity underway in their village as a climate action. Both men and women cite water, the settlement's most palpable indicator of climate change, as their most resonant relative to the others observed at similar levels (53 percent compared to 48 percent), which is consistent for all cohorts, except young men (all Itaukeis – 14 percent, Indo men - 57 percent, Indo women - 48 percent, older Itaukei men - 50 percent, young men 28 percent). Similarly, crop yield/soil health accounts for similar levels of relative resonance as a sign for all cohorts except young men, which means the data's suggestion that Itaukei men, when clustered, are distinct, is less an ethnic marker than an age distinction and a likely engagement indicator at both the project and communal level. For this young cohort, weather is a more highly perceptible indicator as it accounts for the greatest share of relative prevalence of the indicators they note (43 percent), at almost twice the levels shown by all other cohorts that report similar levels of relative prevalence for this indicator (older men - 19 percent, older women - 19 percent, Indo men - 20 percent, Indo women - 17 percent, Itaukei men - 28 percent, but just 25 percent for older Itaukei men—the same for their female counterparts). These indicators reinforce the low climate information base from which efforts to boost climate knowledge, agency and action in this context must emerge.

While the overwhelming absence of youth from the multi-ethnic enclave of Seaqaqa, due to socio-economic and cultural changes, precludes conclusive probity of the macro-group observations along the same contours pursued for Gau and Yaqaga Island, there is strong support for the overall observation from a gendered, and likely ethnic perspective. Across this atypical multi-ethnic enclave, women report no sense of personal influence or inclusion, which suggests negligibility because the project employed a sector specific (farming) and direct engagement strategy that invariably skews towards men, particularly older men with property rights, because of the gendered nature of work that marks such as a male domain. Consistent with this socio-cultural observation, older men account for the totality of positive perception for the subset in equal measure across ethnic groups and in equal proportions relative to other markers of project perception (50 percent each) and neutrality marks the entirety of project perception for young men, which is consistent with observations among young men elsewhere, notwithstanding the sampling constraints noted. However, it is instructive to note that Indo men account for the totality of prevalence associated with negative project perception in this subset and its resonance is equivalent to their other marker of project perception (positivity).

While, the knowledge valence associated with Itaukei women in not discernible from the subset, the researcher can reliably contend that it is akin to levels observed among Indo women (from Navundi only) and young men across metrics because of the similarity in their engagement with the project, the dominant and decisive initial source of climate knowledge in this context. Older men account for the majority of a posteriori knowledge in the subset (three of five), and the knowledge marker accounts for three quarters of prevalence relative to knowledge gap, their only other knowledge marker. This distinguishes older men as the most knowledgeable in the subset, which is consistent with their higher level of direct engagement with the project.

However, there are ethnic distinctions, which may also be indicative of engagement levels. Specifically, a posteriori accounts for the totality of knowledge markers associated with Indo Men, particularly in Navundi, but only accounts for a half for Itaukei men overall and this holds true across youth (all Itaukei men) and older male cohorts. Itaukei men also exhibit the highest level of knowledge gap relative to other knowledge markers in this subset at one-half and in identical fashion across age-cohorts, while women (Indo women from Navundi only) exhibit the lowest level of premium a posteriori climate knowledge. The two other markers of knowledge associated with the cohort also account for a third each of relative prevalence. This suggests they exhibit a knowledge gap similar to that of Indo men (a third compared to a quarter). The third marker is experiential knowledge, for which they account for the totality in the data for the subset, which points to the possibility that probing and linking information provision (formal and informal) for women in this context can simultaneously help attenuate gaps and broaden their knowledge base in a manner that is highly resonant.

My observations about knowledge levels and engagement is consistent with cohort and gendered dynamics associated with climate knowledge acquisition. The data only shows prevalence associated with this metric for older Indo men and women (Navai only), which is consistent with probing the question of knowledge based on its emergence and the distinction of these two groups as most manifestly knowledgeable as established earlier. Project intervention, the primary means of initial climate knowledge acquisition in this subset, accounts for the same share of relative markers of initial climate knowledge for both groups (50 percent each). However, though women exhibit overall lower levels of manifestly credible climate knowledge (a posteriori), their initial sources are entirely manifestly credible, with news being their only other initial source of climate knowledge. This strongly suggests that either these manifestly

credible sources of initial knowledge are insufficient, due to the depth of content, levels of exposure, among other factors, or the intervening dominance of experiential knowledge (informal networks and systems), which is difficult to assess, is an incumbering factor. This is also supported by observations on both Gau and Yaqaga Islands, where groups with lower levels of climate knowledge report acquiring initial climate knowledge from formal and manifestly credible sources at comparably higher levels relative to other sources. This is the case on Gau where all groups, including young men (80 percent—40 percent each for school and project intervention) but except older women (29 percent), report manifestly credible sources (news, project intervention and school) as their primary initial means of climate knowledge acquisition despite maximal levels of knowledge gaps relative to other forms of knowledge.

Similarly, on Yaqaga, while young men who also exhibit maximal levels of knowledge gap but do not demonstrate any climate knowledge acquisition source, young women, who have substantially higher knowledge gaps than older men, cite manifestly credible sources (school) for the totality of their climate knowledge acquisition, whereas such sources (project intervention) only account for a half for older men. Observation and variable other primarily informal sources before the project that are of undiscernible credibility equally (25 percent each) account for the remainder of their knowledge acquisition sources. While inconclusive in the Yaqaga subset, the age association with observation as a significant means of climate knowledge acquisition for older folks is also supported by the data for Gau, where older women disproportionately cite observation (43 percent) as their primary initial source relative to others. This strongly suggests that some common-sense age and macro-group associations hold true and can form the basis on which to frame information provision that boosts agency, action and knowledge for older cohorts, particularly as in both instances observation is resonant with groups with relatively

higher levels of knowledge. However, evidence of young women in Malawai accounting for the entirety of prevalence associated with the Holy Book as a source of knowledge and a level equal to manifestly credible sources like school (25 percent each), confounds other common-sense notions such as the salience of scripturally premised knowledge bases being more resonant among the elderly.

The variations in knowledge bases and perceptions, as well as discernible consistency in risk perception, strongly suggest that variations in motives across cohorts may also function as a critical pillar in boosting climate agency, knowledge and action, which is underscored by the data. Overall, there is no significant distinction between men (39 percent) and women (43 percent) on the community/village motive, the most resonant motive on Gau, relatively to other motives, even though both older men (marginally, at 37 percent to 33 percent) and younger men (double, at 100 percent to 50 percent) outpace their female peers in terms of the prevalence of their communal motive relative to others. However, there is a decisive age distinction with youth being more explicitly communally driven relative to other motives (60 percent compared to 37 percent), with both cohorts outpacing their gendered elders. Older men in both villages also account for a wider range of motives, including the entirety of God/Religion (primarily in Malawai with seven of eight) and the majority of children, with the exception of one attribution associated with young women in Lamiti. However, even in terms of resonance relative to other motives, children account for a third of prevalence for older men (primarily in Malawai—six of nine for men) and just a quarter for younger women in Lamiti. Consistent with other observations of specifications associated with circumscribed localities, young women in Malawai account for the entirety of prevalence associated with communal obligation and their older gender counterparts account for the entirety of self/offspring. Importantly, even with

amalgamating the various motives that are ostensibly communal or inclusive, these observations across cohorts holds true.

The communal orientation of youth is also supported by the data for the Yaqaga subset, particularly on the broader rather than communal disposition of young women. Young women account for the totality of the subset's only motive for action (the community/village), which is consistent with the communal preference for leadership in the subset, for which young women account for the entirety of the community/village indicator, at twice (50 percent) the level they cite a preference for external leadership (26 percent) in terms of relative prevalence, which they also solely account for. While also communal, their male peers (as with young men on Gau at 71 percent for traditional structures), as well as their female elders show maximal preference for traditional structures. Consistent with their high level of fatalism due to trial and errors, older men deferred on the leadership measure.

Regarding leadership on Gau, an age dynamic similarly consistent with observations about motive emerges that reinforces the higher communal orientation of the youth on the island. Youth, particularly young men, privilege communal leadership relative to other forms both in terms of traditional structures (56 percent) and the community/village (33 percent) compared to their elders (44 percent and 32 percent, respectively). While there is also a clear gender dynamic for traditional structures, where it is more pronounced for men overall, relative to other markers of leadership than women (51 percent compared to 20 percent, respectively), there is no such dynamic on the community village marker, where the motive is marginally more resonant for women (38 percent) than men (28 percent), but varies across gendered age cohorts such that older women outpace older men, while young men outpace young women. While both gendered age cohorts register identical levels of resonance for community/village relative to other

leadership preferences, when combined as an indicator of a communal disposition, youth appear demonstrably more communal (89 percent compared to 77 percent for elders). Men also emerge as more communally disposed than women (79 percent compared to 58 percent) and this is consistent across age cohorts as older men outpace older women (78 percent to 50 percent) and young men (85 percent) also outpace younger women at 40 percent). Of the two remaining motives, older folks variably account for the majority of their relative prevalence: older men in Lamiti account for the entirety of preference for external leadership and though the entirety of self-preferences for climate leadership is associated with men in this village, it is primarily associated with older men (two of three). Similarly, older men from Malawai account for the majority of family members (four of five), alongside young men (one of five) from their locality.

However, in Seaqaqa, the most resonant leadership preference (external) is distinctly marked by age and gender, such that older men from across the settlements privilege it as their primary source of climate leadership relative to others and at comparable levels across the three groups of older men (50 percent each for Indo men across Navai and Navundi and two-thirds for older Itaukei men from Rokosalase). Similarly, men from circumscribed localities account for the entirety of the preference for an external person, primarily older men from Navai (a third) and younger men from Rokosalase (a fifth), for which it was substantial though differential levels of relative prevalence. Older women from Navai account for the totality of prevalence attributable to women in the dataset and it is entirely associated with traditional structures, which points to the possibility of a higher degree of relative preference among these women for this form of leadership (maximal) compared to all categories of men (young Itaukei men from Rokosalase at 60 percent, 17 percent for older men from Navai and a third for older Itaukei men from Rokosalase—older men at 18 percent overall). Men, specifically older men from Navundi

and younger men from Rokosalase equally account for the totality of prevalence associated with the only other marker of leadership preference—community/village—but with substantially different levels of relative preference (one-half compared to a fifth, respectively).

While there are discrete variations across gender and age that are variably associated with climate knowledge, the range and credibility of knowledge sources, signs, actions, motives and leadership preferences that can be leveraged to boost climate agency, macro group distinctions in levels of agency and the factors that undermine it also offers insights for the effective provision of subject-matter or task-specific information (fishing, farming, sanitation, etc.) to age-based gendered cohorts that will not just boost knowledge but enable effective action, particularly because levels of climate knowledge do not directly correlate with higher levels of agency (the motive or willingness to act). For instance, on Gau, climate agency, i.e. optimism, is greatest among young men (100 percent), who have intractable levels of knowledge gap and older women (91 percent) relative to other markers of agency. Meanwhile it is lowest among young women, who register 57 percent, which is comparable to levels among older men at 63 percent. While the data shows a clear difference along gendered lines, this is inconclusive as older women outpace older men, while younger men outpace younger women by an even larger margin. There is also no discernible difference in terms of age as optimism accounts for the same level of prevalence for both youth and elders (67 percent) relative to other makers of agency.

Overall, it is noteworthy that older men across both villages account for a broader range of dispositions regarding agency. Of the four remaining markers of agency, older men account for the totality of two (resource gaps and fatalism, solely associated with the cohort in Lamiti in the former instance and two of three in the latter). Older men in Malawai account for the vast majority of prevalence associated with religious fatalism (15 of 18), with younger women from

their village accounting for the remainder. Elders in Lamiti account for the totality of prevalence associated with failed actions, largely men (two of three).

Framing climate change information provision in a manner responsive to various cohorts' levels of agency and specific factors that constrain it will invariably transcend knowledge improvements and enhance capacity to act, which will thereby add purpose to the manifest willingness to act in contexts marked by low capacity. The varied levels of mutability associated with the specified forms of fatalism in Gau and elsewhere, as observed earlier, reinforce this point. This is a critical observation as fatalism, an indicator of a lack of optimism, as observed on Gau, is especially high among engaged project participants and older folks across all populations. On Yaqaga Island, there is a strong correlation between gender and climate agency, such that women (both subsets) exhibit maximal levels of agency (optimism) and men are distinctly fatalistic. However, while there is a clear indication of failed actions as a significant explanatory factor for the fatalism that marks older men (accounting for a third of relative prevalence), which can be tackled because of its demonstrable mutability (see Excerpt 15: The mutability of fatalism induced by nature and failed actions on Yaqaga Island, Dialogue D), there is no clear indication of what underscores fatalism for young men's maximal level of fatalism. However, it strongly correlates with their maximal relative knowledge deficits.

A similar picture is also evident in Seaqaqa that supports the age (elderly) association with fatalism, but without corresponding support (or significant contradiction) for the gendered dimension, particularly because of the inconclusive ethnic and enclave specificity of the non-conforming observation. Specifically, fatalism is solely associated with older folks (men and women in Navai and Rokosalase). It is decidedly oriented towards nature for women in Navai, the only cohort for which it shows prevalence apart from the mixed probing group with older

men. However, it is relatively more intractable for these women (three in eight) than for the mixed male probing group, which, like young men on Yaqaga strongly correlates with intractable levels of knowledge deficit and perceived limits in influence and inclusion. At an even more granular level, while fatalism is marked by age distinction, it accounts for a greater share of relative prevalence for Itaukei women (a third) than any other cohort but at a level comparable to Indo men from Navai (30 percent) and three times greater than for older Itaukei men. While not a conclusive correlation, this observation supports the broader point about the salience of framing information provision for varied macro-group formations well beyond the generally accepted male and female divide to effectively respond to factors constraining agency, boost knowledge levels and enable effective action. This is also supported by a closer look at top-level data for positive agency for the subset. Overall, across all cohorts in this multi-ethnic enclave, men exhibit more climate agency (optimism) than women relative to other markers of agency and at comparable levels (older men - 67 percent, compared to older women - 47 percent), except for younger men (100 percent). However, the apparent decisive gendered correlation is attenuated by circumscribed peculiarities that transcend ethnic boundaries. Specifically, while older men and women in Navundi (both Indos) exhibit maximal optimism regarding climate agency, which distinguishes them from their respective gendered peers (optimism accounts for a third of relative prevalence for Itaukei women and a quarter for Indo women in Navai), it accounts for 70 percent and 50 percent for their respective male counterparts.

Conclusion

Notwithstanding the relatively small sample sizes across project associated populations, this chapter offers considerable insights into the affordances and limitations of three distinct climate adaptation initiatives across villages in Fiji, particularly as it relates to ideational

affordances (knowledge and ability to mobilize it). It reveals differentiated perceptions of the initiatives, levels of inclusion, the state, sources and credibility of climate knowledge, which are directly associated with agency, actions, risk perception and the understanding and ranking of complex interlinked concerns (angsts). Emblematically, both Gau and Yaqaga Island, where climate change information provision, sources and knowledge levels are, respectively, more sustained and widespread and macro-group inclusion is more broad-based, show higher levels of knowledge operationalization than Seaqaqa—specifically, recognition of climate actions, articulation of risk perception and recognition of the links between climate change and chief local challenges. These observations strongly correlate with issue formulation and enactment through communicative and adaptive actions, which underscores the need for sustained cross-sectoral intervention frames even where actions are discrete. Issue recognition and agency, for instance, are highest on Gau and Yaqaga, where comprehensive ecosystems-based and multi-sector but issue-specific projects were enacted over a sustained period, respectively. Conversely, knowledge levels and operationalization in Seaqaqa, which was exposed to a time-bound, circumscribed and issue-specific intervention with manifest climate connections, is so fractured that there is no recognition of current or past climate action.

The chapter also offers insight into overarching approaches needed to boost climate agency, knowledge levels and action, specifically the possibility for effective framing based on and in response to the dominant food security perceptual valence, communal interpretive disposition on risk, leadership and motive. Theoretically, among other things, the chapter points to the complexity that marks factors such as religious and nature-oriented fatalism that undermine, but can be effectively directed to some degree, to improve agency. Their complexity means assertions of the import of frames should be situated in context and are likely highly

subjective even where worldviews, such as faith traditions, are shared. Religious-oriented fatalism observed in Malawai Village, for instance, does not promote inaction but demarcates a clear limit to which action is necessary, warrants support and can or will be viewed as efficacious. In a phenomenally logical fashion, it decisively separates necessary short-term actions with direct benefits (utility) from panaceas, while linking participation with end-time preparatory rituals or duties. However, the mutability of religious fatalism observed in that Gau Island village contrasts with more fixed expressions and convictions held across faith traditions (Hinduism, Christianity and traditional retentions) in the multi-ethnic enclave of Seaqaqa. The absence of initial and explicit immutability evident in fixed forms of religious fatalism means the openings that can be enabled by framing environmental stewardship as a matter of morality and ethics or a religious duty of care, akin to Pope Francis's (2015) second Laudato Si' Encyclical "On Care for our Common Home," are conditional and variable even within faith traditions in the same context.

Relatedly, the geographically, culturally and programmatically varied chapter also points to the high importance of spatial variables, including proximity to domains (land, sea, waterways, among other things) affected by climate change-induced events strongly influence the signs/indicators of climate change that define people's perception of climate change. Poignantly, water, which does not register among the study populations on the relatively pristine islands of Yaqaga and Gau, dominates the frame through which the study population in Seaqaqa, an arid inland region, perceives climate change. Similarly, the sea and related domains (coastal, etc.) did not emerge as perceptual markers in Seaqaqa (a settlement in the deep interior), whereas they are first-order signs/indicators across the coastal villages on Gau and Yaqaga.

The chapter also challenges the proximity thesis by probing compelling evidence of proximal bifurcation of climate change indicators, signs and action that could pave the way for optimizing climate knowledge, agency and action by focusing on improving proximal and multi-level distal perceptual blocks to climate and environmental messages, changes and actions. The extant literature suggests that climate perception, action, agency and knowledge singularly conform with proximity, such that temporally and spatially distal frames are ineffective (Lorenzoni & Pidgeon, 2006; Moser, 2010; O'Neil & Hulme, 2009; Spence & Pidgeon, 2010; Weber, 2006) and highly proximal ones are effective (Galloway, 2010). However, the chapter suggests that while especially proximal actions (routine, domestic and income generating) are recognized as ongoing project activities, they are not identified as climate change actions even where climate knowledge and operationalization are high. Similarly, distal and specialist actions (re-emergence of bird species and use of submerged fish aggregation devices) are not recognized as climate actions, which suggests perceptibility is not singularly a factor of proximal or distal relevance but also cognition.

At a programmatic level, the analysis also highlights macro-social group fissures that are largely associated with differential inclusion in decision-making. These distinctions are also associated with and compounded by pronounced group dissimilarities (primarily age and gender, but also ethnic in Seaqaqa) across multiple critical dimensions that reinforce the need cohort-specific inclusion into decision-making processes and the differential informational and engagement needs of discrete populations segments in order to effectively boost knowledge levels, agency, motive, action and invariably other factors such as project perception. These highly circumscribed and cohort-specific distinctions and needs are consistent with the significance of the complexity of frames observed and the structuring effect of contextual factors

on climate change perceptions. So, while the chapter clarifies significant leverage points, namely the dominant food security frame, shared risk and motive disposition, alongside a preference for communal leadership, the communicative needs necessitated by these climate change impacted communities are multiple and chiefly dialogic and likely informal and on-going.

More broadly, the differentiated affordances and limitations associated with the three projects and the significant variations in the macro-group dynamics across villages, indicates the possibility that both the adaptation pathways or futures being pursued and the communication approaches necessitated vary significantly. Accordingly, I will draw upon the contextual and theoretical insights outlined here, alongside findings from India and Belize, to map the contours of the adaptation pathways or futures being enabled by discrete climate adaptation efforts, and articulate how they might be refashioned to effectively boost capacity and mount commensurate responses to the challenges observed, including the associated communication approaches warranted by each pathway.

Chapter Seven: Indian Case

The onset of global climate change lays bare the Indian paradox. While often derided for being the world's third largest polluter, this vast and populous sub-continental nation's equally significant place among the most vulnerable to climate impacts is not as widely known and contemplated. Even on a discrete measure of climate risk (coastal geographical exposure), India's large-scale exposure and vulnerability to hazards dwarf highly legitimate fears about climate impacts and sea-level rise that generally accords primary focus to small island and low-lying developing states (SIDS), particularly those in the Caribbean and Pacific regions. With virtually a quarter billion people living within 50 kilometers of its nearly 8,000 kilometers of coastline that spans half of all states and 87 cities and towns in proximal distance (Goswami, 2010), the scale of vulnerability to sea level rise is compounded. This contributes to increasing disaster risk that is already manifesting in the loss of lives, assets, livelihoods, cultural domains, increasing food insecurity, etc., across a wide-range of communities.

While economic estimates offer limited insights, the Asian Development Bank's projection that these and wider climate risks could cost the Indian economy 1.8 percent per year and nearly a tenth of total economic activity by the end of the century (Ahmed & Suphachalasai, 2014), offers credible insights into the likely ripple and compounding social costs of limited budgets for investment in social services, improving infrastructure to enable growth and/or the indebtedness economic contraction promotes amidst efforts to merely cope with climate impacts. It also underscores the poverty-response frame for global ecological disruption that marks India's long history of working on environmental issues, including the negotiation of the 1992 United Nations Framework Convention on Climate Change (UNFCCC), and the active participation of former Prime Minister Indira Gandhi at the 1972 Stockholm Convention that led to the creation

of the United Nations Environment Programme (UNEP). Widely acknowledged as a first among global political figures, the Indian Premier's landmark "Man and Environment" speech decidedly linked poverty and the environment (Gandhi, 1972). She contended that without solving the problem of poverty, efforts to protect the environment would falter because existential imperatives of food, shelter and clothing are paramount concerns for the poor.

> Are not poverty and need the greatest polluters? For instance, unless we are in a position to provide employment and purchasing power for the daily necessities of the tribal people and those who live in or around our jungles, we cannot prevent them from combing the forest for food and livelihood; from poaching and from despoiling the vegetation. When they themselves feel deprived, how can we urge the preservation of animals? How can we speak to those who live in villages and in slums about keeping the oceans, the rivers and the air clean when their own lives are contaminated at the source? The environment cannot be improved in conditions of poverty. Nor can poverty be eradicated without the use of science and technology (Gandhi, 1972, Man and Environment, para 8).

Consistent with this frame, in the lead up to the landmark Paris Conference on Climate Change, India touted its "long history and tradition of harmonious co-existence between man and nature, [noting its citizens] have regarded fauna and flora as part of their family" (India INDC, 2015, p. 1). India submitted one of the most highly anticipated and ambitious Intended Nationally Determined Contributions (INDCs) towards the fashioning of the landmark Paris Agreement on Climate Change (2016). India's submission distinctly sought to strike a balance between addressing daunting social and economic challenges on one hand and environmental imperatives, the exigencies of which it is among the most vulnerable to, on the other. The country's teeming population, urgent need for access to 'decent work', basic health services,

potable water, electricity and other critical services needed to improve and sustain livelihoods, coupled with its own status as one of the most vulnerable nations in the world, compels India to seek pathways to deftly manage both its social and economic aspirations while tackling climate change. In fact, the country's policy framework rightly suggests that these two urgent national priorities are inter-related pursuits.

The INDC prioritizes and proposes a host of investments in "no-regrets actions" to tackle climate change, which at once allows room for India to address the critical challenges of poverty, food security, infrastructural challenges, etc. that are necessary even without a changing and variable climate. However, the staggering US$2.5 trillion price tag associated with realizing these ambitions by 2030 (India INDC, 2015) underscores the divergence between India's adaptive needs and its capacity to independently tackle them, not least in financial terms. This is made clear by the author of India's INDC submission:

> We have given our commitment that we will be reducing the emission intensity of our GDP. That means in absolute numbers our emissions are not going to decrease because we have large developmental goals. We have [a] development gap in terms of providing electricity to more than 300 million people who don't have electricity at the moment; we have to provide food to 250 million people who don't have two meals a day - one fourth of the [world's] hungry people live in India. So, then, we have to provide housing for all. So, these are some of the important development goals which the country has to provide in finite years—that is, in another five to seven or 10 years (L. Rajaman, personal interview, August 8, 2016).

Further, the Climate and Development Knowledge Network's (CDKN) review of India's policy space, implementation plans, ongoing work and subnational interventions across states

and conurbations also points to a range of operationalization and implementation issues that undermine the realization of what Bhatt terms "opportunities for co-creation of green technologies and green growth" (cited in CDKN, 2015 p.3). CDKN (2015) notes these opportunities include reconciling green growth and human development, recovery from disasters, water management, social inclusion, sanitation, the development of cooperative paradigms/multi-stakeholder engagement and addressing gender disparities. However, the low profile of discrete successes at the sub-national level in integrating climate change mitigation and adaptation with economic imperatives in states such as Bihar, Jharkhand, Odisha, Uttar Pradesh and Gujarat, as well as this researcher's stocktaking of a range of actions (energy efficiency, decentralized solar use, among others) in 2016, strongly suggest it is imperative to take a closer look at local applied knowledge across this country. Such probity is anticipated to reveal multilevel people-oriented and scalable actions that can be taken to boost adaptive capacity, mitigate climate change and safeguard economic growth at the same time, in accordance with the broad-based opportunities CDKN notes can be realized alongside successful implementation of India's INDC.

Table 26: The climate interventions with their associated discrete and combined field sites, implementers and funders in India

Country	Project Name	Implementer	Funder	Villages	Village Subset
India	Forest Forever! Forests Ecosystem	Laya	Assorted, mainly local	Munagalapudu Polusumamaidi Nelloikota	Laya
	PRAGATI-CARE Sustainable Tribal Empowerment Project (PRAGATI-CARE-STEP)	*PRAGATI	CARE-India	Agraham Sunaladana Palem Itikalakota	PRAGATI

Accordingly, this chapter probes the implementation of two integrated rural development initiatives that variably tackle climate impacts through mitigative and adaptive initiatives across seven remote Adivasi Hamlets in the East and West Godavari districts of Andhra Pradesh, southern India (see Table 26; Appendix Countries-Projects-Villages for all projects across the

three field countries). Consistent with this study's explicit focus on climate change impacts and responses on the margins, these indigenous tribal communities were selected because they offer unique insights into the efficacy of response mechanisms at the base of a society marked by vast complexities. These national convolutions include multiple and distinct vulnerabilities, such as socio-cultural impediments like casteism that intricately stratifies and varyingly excludes hundreds of millions. Additionally, India's climate reality is analogous to the global contestations around climate politics about risk and responsibility because of the differentiated ways in which peoples and regions of India contribute to, benefit from and are (or will be) affected by climate change-induced impacts. Specifically, these tribal hamlets are entirely populated by scheduled castes and tribes, the most socially, politically and economically excluded in Indian society. This highly vulnerable population with low capacity (poverty, exclusion) is mostly concentrated in the High Altitude Tribal Zone (HATZ), a geo-climatic zone marked by large-scale increasing exposure and vulnerability to both climatic related and man-made hazards, including floods/village inundations due to damming, landslides and droughts.

Such vulnerabilities in a low capacity context means the nature, status and condition of natural resources in the region, primarily land, forest and water, which are critical for sustenance and affirming identity, are increasingly sensitive and exposed to socio-economic and environmental degradation. So, in a cyclical and increasingly dangerous manner, this further undermines already low coping capacities at an existential level and compounds already disproportionate and growing disaster risk. As observed in my theoretical chapter, it is this intricate link between social vulnerability and intensified climate change impacts that exacerbates the former and underpins the multi-dimensional action purview of this research. These contexts typify what Kasperson et al. (cited in Dow et al., 2006) describe as the

concentration of harm and risk among certain populations and Leichenko and O'Brien's (2000) warning that climate change and globalization are likely to create "double losers" (p. 228). This view cogently paves the way for, as my study does, "giving special attention and consideration to the most vulnerable in our efforts to reduce human drivers of climate change and to ameliorate the human harm and suffering that will come in its wake" (Dow et al., 2006, p. 79).

Methodologically, the case is predicated on qualitative analysis, including textual examination of project documents associated with the two climate change initiatives underway in my study sites, including communication aimed at my units of analysis during the project, extensive participant observation, several site visits to project installations, as well as, eight semi-structured focus groups with project beneficiaries and two semi-structured individual interviews with project leaders that were conducted over a two-month period under relatively immersive conditions. As detailed in the methodology chapter, both focus groups and individual interviews were conducted using a common set of guiding questions (See Appendix O). These direct engagements with the study population yielded a sample population of 121 (see Table 27) drawn from the seven field sites (see Appendix F for village-level sample profile and data for each subset). While the sample size is moderate at only a fifth of the total adult population in the combined field sites, its representativeness is buttressed by a high degree of household representative (47%) and comparable levels of engagement across gendered and age categories.

Table 27: The Indian sample profile based on the adult population and households across field sites.

India	Adult Pop. In Field Sites	Sample	Households in Field Sites	Households Sampled	Men	Women	Focus Groups	Youth
Total	645	121	133	62	66	55	8	53
Rate		19%		47%	55%	45%		44%

Structurally, the case is formatted in accordance with an integrated typology that combines the two elements (transcript and project codes) of the thematic logic order (see Table 28), a non-random procedure devised to analyze project and interview data and identify the

decision-making processes that underpin climate action and inaction at the village level. However, the analytical units gender and traditional practices, alongside other macro-group dynamics such as youth and age, are progressively integrated because of their high and comparatively more significant resonance in the dataset for this country case. As outlined under paradigmatic considerations in the methodology chapter, this typology is consistent with Gladwin's (1980) study of non-adoption of agronomic recommendations. All codes and themes are defined in Appendix A, and macro group data are outlined in Appendix K.1 to K.12 and L.1 to L.12 for study sites associated with PRAGATI and Laya, respectively.

Table 28: The integration of the thematic logic order to inform case structure

	Thematic Logic Order for Non-Random Data Analysis	**Integrated Thematic Logic Order**
	Transcripts	**Case Structure**
	Climate Action	Project (Type and) Framework
	Knowledge	Project Activities
	Climate Knowledge Acquisition	Project Action and Causes Profiled
1.	Signs/Indicators	Belief Progression
	Cause and Proximity	Project Outcomes
2.	Climate Risk	Project Perception
3.	Climate Agency	Personal Inclusion and Influence
4.	Motive for Action	Knowledge
5.	Climate Leadership	Climate Knowledge Acquisition
6.	Project Perception	Signs/Indicators
7.	Personal Inclusion/Influence	Climate Action
8.	Belief Progression	Cause and Proximity
9.	Angst	Climate Risk
10.	Traditional Practices	Climate Agency
11.	Gender	Motive for Action
12.	Schooling	Climate Leadership
13.	**Project Documents**	Angst
	Project Framework	
	Project Activities	**Cross-Cutting**
	Project Action and Causes Profiled	Gender
	Project Outcomes	Traditional Practices

While both projects employ a livelihood-enhancement model that seeks to boost the capacity of marginalized Adivasi tribal communities highly dependent on a natural resource base undergoing significant changes induced by climate change and variability, they differ significantly in scope, nature and the degree to which they explicitly address climate change.

The Laya Project

The Laya Project uses an integrated rural development model grounded in the geographical and socio-cultural realities of Adivasi communities to empower these marginalized populations in the assertion of their rights and adoption of sustainable alternatives to boost their livelihoods amidst a confluence of challenges that functions independently and collectively to exacerbate their plight. The approach is based on a long process of learning through participatory research, experimentation and exploration of different facets of livelihoods, inclusive of the dynamics of land, forest, water, and practices; family and community level entitlement and access to the resources and micro-climate community level support systems. Laya's core work includes human rights, youth and women's care, micro credit and enterprise, natural resource management, decentralized renewable energy options and multi-level networking and advocacy.

The project's responsiveness to the core of Adivasi tribal communities across the facets outlined, particularly natural resources, is central as they are primarily affected by displacement and land alienation, as well as a multiplicity of threats to the region's essential high natural resource base, namely water, forests and minerals, with which identity, livelihoods and survival are intricately bounded. So, these threats, which also include a multiplicity of market demands from agri-business, mining, hydropower and climate change, though functioning independently, are intricately linked and exacerbate the plight of the Adivasis. Accordingly, ecological management, which underscores the rights-based integrated rural development framework employed by Laya, is intended to contribute "towards a dignified, locally appropriate and ecologically sustainable lifestyle among Adivasi communities" amidst unprecedent socio-economic and climate change-induced environmental challenges (Rhythms in Development III, 2013, p. 17).

"The macro-level challenge of climate change has implications at the grassroots level both in relation to mitigation and adaptation" (Rhythms in Development III, 2013, p. 11). The climate justice contentions at the heart of India's INDCs makes clear that both climate response mechanisms must be pursued without compromising on the development aspirations of the marginalised. Accordingly, Laya's rights-based integrated rural development approach creatively deploys mitigation responses through tribal community centric "Clean Development Mechanisms" collaboratively with the Fair Climate Network and promotes decentralized domestic energy options (micro-hydel, solar lighting and fuel-efficient cooking stoves). Simultaneously, its adaptation initiatives primarily surround natural resource management, sustainable agriculture (climate-resilient crop varieties, diversification, low carbon farming) and decentralized renewable energy options. Consistent with the rights-based sustainable development framework, it privileges the perspectives, experiences and entitlements of communities greatly impacted by climate change. Programmatically, this is evidenced through Laya's use of vulnerability assessments to capture the perspectives of Adivasis on climate change to design interventions, empowering capacity building efforts with explicit gendered dynamics and a concerted focus on manifestly political issues such as land alienation and human rights through advocacy and legal representation, which are intended to boost coping capacity and promote resilience.

PRAGATI Project

The PRAGATI initiatives employ a similar rights-based integrated rural development approach. Its initiatives integrate efforts across three thematic areas (health, education and livelihoods), which are implemented with reference to the landmark Panchayathi Raj Scheduled Area Panchayathi Raj Extension Act (PESA Act). The PESA Act constitutionally legitimates the

traditional system of self-governance in areas occupied by scheduled castes and tribes (Gram Sabhas) around management and allocation of customary resources. Consistent with this rights-based integrated rural development approach, PRAGATI leverages partnerships with community-based entities, technical centres, such as the Integrated Tribal Development Agency (ITDA) Krishi Virgna Kendras, to promote capability enhancement through natural resource management and optimization; climate resilient agricultural and forestry practices such as seed diversification, inter-cropping and value chain promotion for increased income and forestry regeneration programmes through community management. Consistent with the centrality of natural resources to Adivasi livelihoods and identity, the project puts ecological management of natural resources at the core of its efforts to support Adivasi communities in their quest for a "dignified, locally appropriate and ecologically sustainable lifestyle" (Rythyms in Development III, 2013, p. 17). It explicitly links favorable environmental stewardship with the ability of Adivasis to generate capabilities and assets necessary for improving their livelihood security at the household, community and village levels. "Without [the] forest, village[s] cannot survive. These people have to protect the forest…survival is dependent upon this for tribals" (J. Nalli, personal interview, November 2017).

While the PRAGATI approach does not tackle climate change as frontally as Laya does, climate adaptation is at the core of internal project development and framing. PRAGATI introduces a range of actions aimed at addressing climate impacts through improved livelihoods. These include climate resilient agricultural and forestry practices. Climate resilience activities include the phasing out of podu (shifting) cultivation; value chain promotion for increased income; promoting bunding activity (stone wall/retainers) to improve watershed management and limit soil erosion; inter-cropping and seed/crop diversification, such as cashew and mango

planting, to encourage forest management without further undermining low capacity coping capabilities and combat climate induced shortages of a range of crop varieties. While resilience building in forestry includes regeneration programmes through community management. Consonant with the rights-based integrated rural development focus that privileges ecological management, these resilience building efforts are underscored by land development and mobilization activities that seek to maximize rights and entitlements afforded by the 2006 Forest Rights Act.

Philosophically, this approach is akin to the provision of climate information and support on a need-to-know basis, as observed on Gau Island, Fiji. In this context, climate knowledge and actions are introduced based on arbitrary developments to influence response to and management of prevailing concerns rather than drive overall activities. For instance, in 2018, much of the agronomic interventions focused on the impact caused by heavy rains, but in 2017, agronomic and broader actions across PRAGATI's three thematic areas were focused on the impact of a drought. This contingent and unstructured issue-specific response mechanism is used to explain the need for decisive climate adaptation action, including alternative cropping mechanisms. For instance, sorghum, which a drought dries and renders unproductive, is replaced with black gram or red gram, which thrives in drought conditions and aides in the prevention of soil erosion that affects both housing and forestry. This approach is reinforced through the provision of deeper explanations of proposed actions to climate-induced impacts where it is deemed necessary. This is exemplified by community-level engagement activities to reduce disaster risk in flood prone areas. These meetings with specific committees in the villages aid in creating awareness among the Adivasis in the river basin that highlights the potential for soil erosion and the consequence

of silt and decisively links activities in the hills with the disasters that can enhance and/or reinforce scope of knowledge.

Given the importance of climate knowledge in structuring support for and driving climate action (Chess & Johnson, 2007), the difference that marks the integration of climate change and environment in the initiatives led by Laya and PRAGATI across different villages with a shared geo-political, social and climate risk profile is of great import. Multi-level comparative probing of the efficacy of these approaches is likely to yield insights on how to manage changing tribal perceptions of trees and the forest amidst modernity, which is increasingly undermined by droughts, emerging pests and diminishing yields that afflict agriculture, the region's mainstay. Changing tribal perceptions of the forest is exemplified by how the domain has shifted from being a preserve consciously used for domestic purposes, to becoming a source of construction of pukka (permanent) buildings and more intensive activities as coping capacity dwindles.

Project Perception and Belief Progression

Table 29: The level and nature of belief progression across study sites in India

Subset	Village	Immediate		Progressive		Totals
		Prev	Rate	Prev	Rate	
Laya	Pulusumamidi	0	0%	1	100%	1
	Nallikota	0	0%	0	0%	0
	Munagalapudu	0	0%	0	0%	0
PRAGATI	Agraharam	0	0%	0	0%	0
	Itikalakota	0	0%	0	0%	0
	Palem	0	0%	6	100%	6
	Sunaladana	0	0%	0	0%	0
	Totals	**0**	0%	**7**	100%	**7**

Table 30: The relative nature of project perception in each study site in India

Subset	Village	Positive 1		Totals
		Prev	Rate	
Laya	Pulusumamidi	14	100%	14
	Nallikota	1	100%	1
	Munagalapudu	11	100%	11
PRAGATI	Agraharam	0	0%	0
	Itikalakota	5	100%	5
	Palem	5	100%	5
	Sunaladana	8	100%	8
	Totals	44	100%	44

Consistent with the responsiveness of these rights-based integrated rural development initiatives to the existential precarity and systematic socio-political and economic marginalization of the Adivasi tribal populations, positive perception accounts for the entirety of prevalence associated with project perception in both village subsets (PRAGATI and Laya) and across all cohorts studied. However, initial receptiveness is marked by considerable reservation, as progressive belief in the proposed interventions accounts for the totality of the study population's initial belief and receptivity. The data suggests this is attributable to a confluence of low knowledge levels; variations in engagement; low agency; diminishing capacity; fissures in traditional structures that undermine local leadership, alongside the intractable nature of the highly proximal challenges induced by climate variability and socio-political change and unrealized successes in prior attempts to cauterize historical exploitation (see excerpts 18, 35, and 41). Probing the data to ascertain perceptions of the interventions, particularly inclusion and influence, is likely to offer significant initial explanations for these observations about belief progression and further contextualize observations of maximal positive project perception. It also offers a basis for understanding the affordances and limits of these interventions for boosting climate knowledge, agency, motive, action and leadership consummate with the prevailing challenges across these contexts.

Excerpt 18: Variations in engagement at the village level

Older Women Focus Group – Agraharam Village, PRAGATI Subset
Interviewer: Are you familiar with PRAGATI? Respondents: Yes, they help us during floods they supply food, blankets etc. Interviewer: Tell me something they give you? Respondents: Rice, clothes, vessels, dals, blankets. Interviewer: Did they give anything for farm? Respondents: Seeds of maize, pesticides. Interviewer: Why did they give you seeds? Did they tell? Respondent 1: Yes, they said we get good crop. Respondent 2 & 5: Yes Interviewer: Have you done training by PRAGATI? Respondents: We don't know. Interviewer: PRAGATI when giving to them have list with them? Respondents: Yes, they have list of families. Interviewer: Did they give to wives or any one? Respondents: Whoever in house they will give them. Interviewer: Would you like to learn more about climate change? Respondents: No.

Interviewer: Why don't you want?
Respondent: We don't have interest.
Interviewer: Would like to learn more about climate change?
Respondents: Yes, if they teach here only.
Interviewer: Before PRAGATI started giving seeds, did they ask you what you want or simply give you seeds?
Respondents: [Cross talk] Seeds given to only 10 families in our village.
Respondent 5: I got the seeds because I have own land.
Respondent 1: We don't get seeds we don't have own land.
Respondent 2: We don't get seeds we don't have own land.

Personal Inclusion and Influence

Table 31: The relative nature of perception of personal inclusion and influence in each study site in India

Subset	Village	Mixed - 2		Positive 2		Youth Consultation		Totals
		Prev	Rate	Prev	Rate	Prev	Rate	Prev
Laya	Pulusumamidi	4	19%	12	57%	5	24%	21
	Nallikota	0	0%	3	75%	1	25%	4
	Munagalapudu	0	0%	6	86%	1	14%	7
PRAGATI	Agraharam	0	0%	1	100%	0	0%	1
	Itikalakota	0	0%	4	80%	1	20%	5
	Palem	0	0%	21	100%	0	0%	21
	Sunaladana	0	0%	4	100%	0	0%	4
	Totals	**4**	6%	**51**	81%	**8**	13%	**63**

Overall, the data (see Table 31) shows a majority of the study population believes the interventions were inclusive and afforded them personal influence. Three of the five codes denoting personal inclusion/influence are active in the overall data set (Positive-2, Youth Consultation, and Mixed -2). However, only the top two most grounded codes are evident in both village subsets: (Positive– 2: 51 of 63 and Youth Consultation eight of 63) and in the same order of rank (Positive-2: 30 of 31 in PRAGATI Villages, and 21 of 32 in Laya Villages; Youth Consultation: seven of eight in PRAGATI Villages and one of eight in Laya Villages)). The third active code is only grounded in the Laya subset (four of 32). So, while the overall perception of personal inclusion and influence is positive with no prevalence for negative or neutral perceptions, it is decisively more positive in the PRAGATI subset (81 percent versus 66 percent in Laya Villages).

So decisively positive is the perception index in the PRAGATI subset that Positive-2 accounts for the totality of prevalence for the theme in all villages in the subset (Sunaladana and

Itikalakota, four of four each and Palem 21 of 21), except Agraharam where the second code, Youth Consultation, registers in a single instance and accounts for the same level of prevalence as positive perceptions. This is consistent with PRAGATI's contingent and unstructured issue-specific response mechanism, which is used to explain the need for decisive actions, including alternative cropping mechanisms and reinforcement through community-level engagement that provides deeper explanations of proposed actions where it is deemed necessary. A more granular examination of the data across villages and cohorts reveals that the nature of engagement, particularly so for PRAGATI villages, where an unstructured issue-response model is employed, may account for the distinction between the two village subsets and Agraharam's distinction in the PRAGATI subset.

For the PRAGATI subset overall, women, primarily older women (11 of 31) account for a higher portion of prevalence for the theme and therefore feel more included in the livelihoods-oriented climate change activities underway in their village, which is consistent with the intervention's focus on aspects of life that are culturally designated as feminine domains across livelihoods and health (see emphasis on attendance at Development of Women and Children in Rural Areas (DWCRA) meetings over general meetings in excerpt 10). But, rather than gender as a durable correlating factor on this measure, it is age that shows more enduring correlation. Emblematically, older men also account for a higher portion of prevalence accounted for by men (eight of 31 versus six of 31) and both young men and young women account for the same level of prevalence (six of 31 each). However, these trends are overwhelmingly swayed by each age-based gender cohort in a single circumscribed locality. In Palem, each gendered cohort across the young/old divide account for a disproportionate amount of the prevalence for positive perceptions of personal inclusion and influence for their cohort/peers across the overall

PRAGATI subset: almost three-quarters for older women (73 percent or eight of 11), maximal for older men (six of six), two-thirds for young women (four of six) and sixty percent for young men (three of five), while their peers in Agraharam (young men) account for all. Palem's distinction supports the likely effectiveness of PRAGATI's issue-specific response mechanism in boosting inclusivity, across age and gendered cohorts where deployed (see excerpt 19).

Excerpt 19: Direct cohort engagement, variably focused training and male-centric engagement

Young Men Focus Group – Palem, PRAGATI Subset
Respondents: PRAGATI means how we can increase our earning. They teach us. They gave us small plants and taught us how to plant by digging around the trees and putting manure. Cutting the dried leaves, how to space the trees. They bring the farmers and make them groups like DWCRA (Women's group), they formed groups for farmers. They collected 50 or 100 rupees per person from each group, groups may have 20 people. The money is collected and kept with us only and put in the bank. If we need it, we will take it. If I need it tomorrow, for farms, tree cutting in jungles, problems in families, family functions like puberty function, marriages, we take the money when needed. We pay back the money with (25 paisa) interest to the group after a while. Interviewer: Okay. Thanks. And there are four groups? Respondents: In our village we have 13 groups. Interviewer: 13 groups in the village? The guy from PRAGATI told me there are four. Are you all in the same group? Respondents: No sir, different groups. Interviewer: All of you are different groups? None of you are in same group? See, the specifics to a question matter to me. Respondents: [Crosstalk] Same. Interviewer: So, you two are in the same group? One two, same group? And nobody else is on your group? Yeah. So we have five groups of the 13 represented here. Respondents: Others are there. Interviewer: Did PRAGATI talk to you about climate change at all? Yes/no? Respondents: No sir. They told us to do this in rainy season, summer this… [Crosstalk] Interviewer: What, what was that? Oh, they tell you what to do in the season. Did they use the words climate change to you? Respondent 4: Yes. Interviewer: What did they say to you about climate change? Wait, wait, wait, before we get … [Crosstalk]. Wait, wait, wait, wait, wait. I just have to get the numbers. So, you said that they told you about climate change. Did Pragati tell, say anything about climate change to you? It is yes/no sorry Respondents: No. Interviewer: So, only one-person PRAGATI said climate change to you? Where did PRAGATI tell you about climate change? Respondents: Through this organization, in the meetings. They take us for meetings. They tell us what to do with change in weather. Suppose there is cashew … weather changes. Rampachodavaram [Place]. Interviewer: Layered questions about it. So, I want just specifics. What kind of training? What was the name of the training that you went to? Respondents: PRAGATI, cashew plantations, economic benefit. Interviewer: Mm hmm cashew, okay. And at that meeting they talked about climate change? Respondents: Yes. Interviewer: Was that the only meeting that they talked about climate change? Respondents: We went to other meetings on the same issue. Interviewer: The same economic development thing? Respondents: Yes. Cashew, mango, weather. By planting cashew how the weather changes. Not only cashew or mango, because of these, how the weather changes, what changes will come they taught. Interviewer: You've given me really good info, but I need to connect everybody's story to it. Have you all been to trainings? Respondents: No. Interviewer: So, that is an important factor for me. It is the training that distinguishes him, he knows a lot about it, because he goes to the training. So, that is my process. See, this is good. Umm how are you selected for the training? Respondents: The organization used to come and take us. In the village the elders selected four people and sent them. Interviewer: They selected four people and the 4 people are? you and who else? Respondents: They are there. They went to the fields. They are educated. Interviewer: Okay. They are what? Respondents: Educated. Interviewer: They all what? Respondents: Went into the farm. Interviewer: They are at the farm now. Okay. Are they young like you? Or they older? Respondents: Young and old. Interviewer: Okay. So, they just picked four educated people. Are they all men? Respondents: All are men.

Excerpt 20: Complexity of perceptions: Personal influence and inclusion undermined by a lack of cohort specific engagement among young men

Young Men Focus Group – Pulusumamidi, Laya Subset
Interviewer: Do they ever meet with you as a young group, just like I come here and I talk to you as a set of young guys, one on one? Respondents 1: They talk. Respondent 2: They take us to meetings. But, they are for all the people. No. Interviewer: Oh, okay. Do you think they should meet with you as a young group? Respondents 1, 2 & 3: Yes. Interviewer: It would be beneficial. Oh, okay. If you had a suggestion, if you had ideas that you wanted to tell Laya, would you feel comfortable telling Laya? Respondents 1: Yes, they would hear. Respondents 2 & 3: Yes.

Differences in perceptual dispositions associated with personal influence and inclusion across the Laya subset offers strong support for the engagement thesis emerging from the PRAGATI dataset. Specifically, differences in the nature and scope of engagement across villages structure complex perception valences, particularly among young men in Pulusumadi who exhibit high motive and self-identify as potential climate leaders but perceive themselves to be less personally included and influential in project activities (see excerpt 20). While positive perceptions are the most grounded in all three Laya villages and account for more than half of Person Inclusion and Influence's prevalence, it ranges widely: from a high of 86 percent in Munagalapudu and three-quarters in Nallikota, to 57 percent in Pulusumamidi. While three codes demarcating perceptual makers associated with personal inclusion and influence are grounded in the subset, this only holds true in Pulusumadi where mixed perceptions found in the dataset are entirely concentrated and account for nearly a fifth of the measure's prevalence (19 percent) in the village. However, the other two active codes (Positive-2 and Youth Consultation) are grounded varyingly, although in the same order of rank, in all three villages.

Overall, men account for a vastly greater portion of the theme's prevalence (21 of 32) with little variation across age groups (older 11 versus young 10). However, a closer look at the measures on which each cohort's perceptions are captured reveals that age rather than gender is a more significant factor associated with perceptions of inclusion. Young men, for instance, account for the totality of prevalence for youth consultation (seven of seven) and theirs is the

only group in the dataset where positive expressions of personal inclusion and influence does not account for the majority of prevalence or first ranked perception on this measure (four of 11 versus seven of 11 for youth consultation). It is their self-identification as leaders and the absence (in most cases) or limitations of cohort-specific inclusion that directly undermines their perception of inclusion and influence over the project, as evidenced by excerpt 43. Conversely, young women, who do not self-identify as climate leaders—perhaps due to socio-cultural factors—and share the same overall positive perception of the project itself, feel the most personally included and influential. In fact youn women are the only cohort for which positive perceptions of inclusion accounts for the totality of prevalence for their expressions on this measure. This comports with the staging of population level engagement initiatives through village meetings that makes some effort to open these spaces to women and youth (young women) in accordance with project design. Consistent with this age-based observation, older folks, primarily older women (three of four) account for the totality of mixed perceptions (Mixed-2 (four of four), which is attributable to a lack of experience seeking to enact influence over the project (see excerpt 21).

Excerpt 21: A lack of experience seeking to enact influence results in mixed perceptions of personal influence and inclusion

Older Women Focus Group – Pulusumadi, Laya Subset
Interviewer: Oh okay. If you had opinions, you had suggestions, do you think Laya would listen to you? Respondents 2: We will listen, why won't we? Respondent 1: We will listen. Respondent 2: Will Laya listen to us is what they are asking? [Crosstalk] Respondent 3: We will not know if they listen or not. Because we have never told them anything. So, we do not know anything about that. [Crosstalk] Interviewer: Oh, you don't know if they will listen or not. Oh, okay okay. (Crosstalk) Respondents 3: But previously they gave us plants and did other works and told us how the situation about the Girijan Rythus (Tribal Farmers). They said that we don't know anything and took videos of other tribal communities and showed them to us. Respondent 1: Previously.

However, as intimated by my observations about differential engagement levels, nature and scope, these trends are substantially influenced by various age-based gender cohorts in a single circumscribed locality. It is older men and women from Pulusumamidi who account for the totality of prevalence for mixed perceptions. Similarly, the village's young men account for

three-quarters of prevalence attributable to their cohort across the overall village subset for both positive expressions and in excess of 70 percent of youth consultation. Likewise, their young female counterparts account for 60 percent of the prevalence for their cohort in the overall Laya subset for positive expressions. My engagement hypothesis accounts for these distinctions. Specifically, the fact that a lack of youth consultation in the Laya village subset only appears in this circumscribed context is further reinforcement of the observation that differences in perceptual dispositions associated with personal influence and inclusion is an indicator of differences in the nature and scope of project engagement. This is so as Laya specifically offers special programmes for cohorts such as (older) women (crop selection) and offers fellowships for select tribal youths (primarily males), including those working on sustainable development and broader youth and livelihood coalition building activities. So, most likely, it is the variability and selectivity with which these programmes are implemented across villages (some rather than all) and among youth (particularly active or motivated) in those circumscribed beneficiary localities, that contributes to the distinctions.

Taken alongside observation of the efficacy of PRAGATI's contingent issue-specific response mechanism, which is underscored by deeper engagement on a need-to-know basis where it is deployed, probity of the affordances of variable engagement and the divergent approaches associated with Laya and PRAGATI's efforts may offer insights on critical markers associated with project perception and levels of inclusion and influence. Specifically, understanding their relationship with knowledge levels, identification of cause, climate perception and risk, as well as motive and agency could significantly contextualize the efficacy of current levels of action, and inform pathways for their improvement.

Considering the centrality of knowledge for action and change (Dutta, 2011; Freire, 1970,

1973), particularly on multi-dimensional issues such as climate change with existential implications (Bord, Fisher, & O'Connor, 1997; Grotzer & Lincoln), this warrants close examination of knowledge levels across both village subsets to identify the climate knowledge bases and subsequently probe how and to what end the various engagement levels and frames have structured these climate knowledge bases.

Climate Knowledge

Table 32: The nature and relative strength of various forms of detectable indicators of climate knowledge in India

Subset	Village	A Posteriori		Experiential		Knowledge Gap		Totals
		Prev	Rate	Prev	Rate	Prev	Rate	Prev
Laya	Pulusumamidi	6	43%	2	14%	6	43%	14
	Nallikota	7	54%	2	15%	4	31%	13
	Munagalapudu	3	33%	2	22%	4	44%	9
PRAGATI	Agraharam	3	50%	0	0%	3	50%	6
	Itikalakota	5	56%	3	33%	1	11%	9
	Palem	8	50%	6	38%	2	13%	16
	Sunaladana	7	50%	2	14%	5	36%	14
	Totals	39	48%	17	21%	25	31%	81

Overall, only three of the five analytical units denoting knowledge are grounded in the data for the Indian case (per Table 32, A Posteriori, Knowledge Gaps, and Experiential). Although a posteriori—which is indicative of awareness and understanding of cause and effect—is most grounded in the overall data and is dominant in both set of villages, it is more grounded in the PRAGATI Village dataset where it accounts for over half of knowledge's prevalence (51 percent) for the village compared to just 44 percent in Laya Villages. Conversely, knowledge Gaps are significantly more grounded in Laya Villages (39 percent) than PRAGATI Villages (24 percent). The data also shows that Experiential Knowledge is substantially more grounded in the PRAGATI Villages (24 percent) compared to 17 percent in Laya Villages). Though not sufficient to make a claim about the relationship between experiential knowledge and knowledge levels, it is important to note that both knowledge gaps and experiential knowledge account for identical levels of prevalence in PRAGATI Villages, but experiential knowledge is less grounded

than knowledge gaps in Laya Villages, which have a higher overall knowledge gap. This suggests a significant positive correlation between experiential knowledge (informal) and higher premium or a posteriori climate knowledge and/or lower knowledge gaps, which comports with robust assertions of the legitimacy of indigenous knowledge which is premised on experience and practice (Brokensha, Warren & Werner, 1980; Kohler-Rollefson, 1996; Showers, 1996). That the positive correlation is evident in the PRAGATI village subset—which readily deploys a contingent and unstructured issue-specific response mechanism at a population level varyingly in circumscribed settings to explain the need for decisive climate adaptation action, alongside deeper explanations where warranted—rather than Laya's highly selective cross-cohort and population level approach to ideation, also suggests this correlation is underpinned by the availability of a broad tapestry of information provision (and likely formal) to a wide cross-section of people that aids in navigating experiential knowledge. A closer look at the village subsets also reveals variations in both that offer strong support for this observation. First, let us look at the PRAGATI subset.

PRAGATI Villages

Of the four villages in the PRAGATI subset, only the data for Sunaladana shows prevalence for the three analytical units denoting knowledge in the same order of rank as the overall figures for the subset: A Posteriori (seven of 14), Knowledge Gaps (five of 14), and Experiential Knowledge (two of 14). However, premium climate knowledge (a posteriori), which is more grounded in PRAGATI Villages than Laya Villages overall, accounts for at least half of the prevalence for knowledge in all villages (50 percent in all villages (except Itikalakota where it accounts for a clear majority of 56 percent).

Consistent with the observation that where information provision (primarily formal) is

high or significant, experiential knowledge (informal) does not undermine climate knowledge or exacerbate gaps, Agraharam, the only village where experiential knowledge shows no prevalence, has the highest knowledge gap among PRAGATI Villages (50 percent compared to 11 percent in Itikalakota and 13 percent in Palem, where the prevalence for experiential is one-third and 38 percent, respectively). Further, a similar scenario is evident in Sunaladana where knowledge gap has the second highest level of prevalence ((36 percent) and experiential knowledge is also relatively low (14 percent). Given the overall equitable distribution of a posteriori knowledge in the majority of PARAGTI Villages, what seems to obtain is a correlation between a posteriori knowledge in excess of the halfway mark and lower levels of knowledge gaps as is evident in Itikalakota, where a posteriori accounts for over half of knowledge's prevalence and knowledge gap is the lowest. The availability and accessibility of information that structures experiential knowledge at an individual level is likely to account for this. An assessment of the sources of climate knowledge, which is undertaken in the subsequent section, is likely to indicate the veracity of this hypothesis that the availability of a broad tapestry of credible information provision (formal and informal) to a wider cross-section of people accounts for this and invariably structures experiential knowledge (informal) positively. However, cohort level distinctions across villages consistent with the absence of cohort specific engagement on climate change in PARAGATI's issue-specific/contingent approach that varies across localities offers strong support for this observation.

Overall, age and gender significantly account for the prevalence of some measures of knowledge in the dataset, but broad variations exist across villages. Women (young and old equally (five of 11 each) account for nearly all the prevalence for knowledge gaps (see excerpt 23). This is consistent with the project's lack of explicit cohort-level engagement, such that

where ideational efforts are undertaken, they are at the general community/population-level (e.g. village meetings) function differentially and does not automatically attract women due to domestic commitments, cultural and socio-spatial barriers that curtail the extent to which they participate even when they attend, as exemplified by excerpts 22 and 27. These socio-spatial constraints exemplify the discursive (Dutta, 2011) and practical implications (Cornwall, 2002) of space and the wider micro politics of participation. Older men, who do not account for any of the prevalence for knowledge gaps, account for more than a half of the prevalence for experiential knowledge, which is consistent with my observation of a positive link between substantial reliance on experience knowledge and low knowledge gaps where there is a broad and accessible tapestry of climate information. This consonance between a privileged population subset (older men), access to a wider tapestry of climate information, that likely positively structures their use of experiential knowledge and lowers overall knowledge gaps, is akin to the Donohue and Olien's (1970) knowledge gap hypothesis. But, rather than an infusion of information into the body politic exacerbating knowledge gaps along socio-economic lines, it does so in accordance with gendered socio-political status and socio-spatial access and comfort.

Excerpt 22: Socio-cultural dynamics undermines the benefits of population level engagement for women

Older Women Focus Group - Palem, PRAGATI Subset
Interviewer: Okay. Next question is, before PRAGATI did these things, did they ask you what you want or did they just come and give you seeds? Respondents: Yes, Sir! Respondents: Yes, they ask. Respondents: Yes, when they first came here they asked. Interviewer: Asked everyone? Oh, okay and then they said yes. Has PRAGATI ever talked to you about climate change? Respondents: They tell, sir, about this and that. Because we are women, we won't come always. The men will know as they listen more. We do all household work also, so, not always do we come. Interviewer: But, in the village meetings that you went to, they didn't talk about climate change? Respondents: No, sir. Respondents: No. They generally tell more when the men gather. The men listen and tell us. Interviewer: How often do you go to the village meetings? Respondents: They put those meetings once a month. We attend the meetings once a while. Once in a while we go the hospital. [Laughs] […] Respondents: Groups of women meetings which we conduct, also happen only once a month. Respondents: We collect some money and take them to a bank in another place when needed. Interviewer: The village meeting, how often do they go to the village meeting? Respondents: We also go to those meetings once a month. Interviewer: And how often are the village meetings? Respondents: Monthly once. Interviewer: So, they go to all of them then? [Translator and Interviewer are confused with the fact that both the meetings are separate] Respondents: [Laughs]

[Translator asks the question again]
Respondents: They keep four to five leaders in each group. Five people they take to the Mandals. [Crosstalk]. We generally go to all meetings, sometimes we do not go when busy.
Interviewer: And [YOU] never heard the words climate change in the meetings?
Respondents: No, Sir [in sync]. When they talk to men, they will know more.
Interviewer: Not about the men, we want to know about you.
Respondents: No.
Interviewer: Have they ever used the word environment in the meeting? Did they talk about the environment?
Respondents: No [in sync].
Respondents: [Crosstalk] No, sir. There was a meeting last month. I don't know [if] I heard about it. We don't know about these things, sir.
Respondents: We do other work, sir; so, we must have forgotten.
Interviewer: If you had ideas, would you be okay telling it to PRAGATI?
Respondents: Yes, sir. They will listen. If we want them to bring something, they will bring. They will bring what we want. They won't say no, ever. If we want anything, they will bring.
Interviewer: Okay.
Respondents: If we want anything, they will bring them to us.
Interviewer: Okay.
Respondents: They will call out our name and give us. They will ask us person by person and give what we want.
Interviewer: […] So, you don't know a lot about climate change, [but] would you like to learn some more about climate change?
Respondents: Yes, sir.

While the data offers reinforcement of the view that older folks more readily tap and have access to a broader and likely more relevant range of experiences from which to draw and articulate climate knowledge, such that older men and women taken together account for nearly three-quarters of the prevalence for experiential knowledge (74 percent), young women (18 percent) and older women (27 percent) account for similar levels of prevalence overall, but it is relatively more significant for young women than older women (23 percent compared to 15 percent). Notwithstanding the clear gender imbalance in knowledge gaps, there is no evident age or gendered correlation for a posteriori or premium climate knowledge in the subset. On the combined gender dimension, both men and women account for similar levels of prevalence (52 percent versus 48 percent).

Similarly, in terms of age categories, young men (eight) and young women (five) account for similar levels of prevalence to older men (four) and older women (six) (combined:13 of 23 compared to 11 of 23). However, this apparent gender and age evenness can be attributed to young men from Palem as they account for more than a quarter of the analytical unit's prevalence in the overall data (six of 23). The distinction of this cohort is significantly accounted for by a single participant, who was one of four youth identified by their elders to participate in "deeper

explanations" through capacity building efforts led by PRAGATI that focused on crop diversification and resilience (see excerpt 19). The implication here is that where a cohort is exposed to PRAGATI's issue, context and domain specific ideation efforts, deeper technical explanations to community identified youths could create champions that can further boost knowledge levels at the village level by sharing their heightened learning with an already familiarized and expectant audience. But there is no evidence that this has occurred in a systematic manner, which positions the issue specific response as a single-level intervention with modest outcomes relative to more promising ecologic mechanisms for structuring multifactorial population behaviour and knowledge (Maibach, Roser-Renouf & Leiserowitz, 2008).

So, although the overall data suggests young men are the only group where a posteriori knowledge exceeds half the prevalence for knowledge (see excerpt 30) and therefore supports the observation of meaningful correlation between that occurrence and low levels of knowledge gaps (10% or one of 10), this is only applicable to young men from Palem for whom a posteriori accounts for all prevalence for knowledge. But this also holds true for some categories of women sampled in specific localities: young women in Sunagalapudu (one of one), and older women in Itikalakota (two of two). Probity of the data associated with the Laya subset offers support for the observations drawn from the PRAGATI village subset from different vantagepoints.

Excerpt 23: Intractable Levels of Knowledge Gaps among older women

Older Women Focus Group - Agraharam, PRAGATI
Interviewer: Have you heard word climate change? Respondents: No. Interviewer: Do you notice any problem in farm? Respondents 1, 2 & 5: Back ache. Interviewer: Is there any problem with planting? Respondent 1, 2 & 5: We plant maize, paddy. Interviewer: Did you notice any problem in farm during planting? Respondents 1, 2 & 5: When we were in age we are strong, but now we are weak. Interviewer: But the things your planted, how they growing? Respondents 1, 2 & 5: Depends on availability of water. Interviewer: Do you have water problem? Respondents 3 & 5: Yes, from long years back. [Cross talk] Presently, we prefer to cultivate chilli because it consumes less amount of water. Interviewer: What do you think is causing water problem? Respondents: We don't have motors, so that is the problem.

Laya Villages

In accordance with the structured cohort-level selectivity with which Laya undertakes focused information provision across localities, Munagalapudu is the only village in the subset where the three analytical units that account for knowledge do not show prevalence in the same order of rank as the data for the overall subset. It is the village with the highest knowledge gaps (44 percent, compared to 43 percent in Pulusumadi and 31 percent in Nallikota) and the only instance where the analytical unit is the single most grounded measure of knowledge. It is also the village where a posteriori knowledge accounts for the least prevalence for knowledge (33 percent, compared to 43 percent in Pulusumadi and 54 percent in Nallikota) and the highest level of experiential knowledge relative to other markers in the subset (22 percent, compared to 14 percent and 15 percent in Pulusumadi and Nallikota, respectively).

This correlation between high knowledge gaps and low a posteriori knowledge alongside substantial levels of experiential knowledge in Munagalapudu supports the assertion of a meaningful correlation between lower levels of knowledge gaps (consequently, higher levels of knowledge) and substantial levels of experiential knowledge where a broad tapestry of climate information is available to a wide cross-section of people. It is further underscored by the fact that, Nallikota, the only village where a posteriori accounts for more than half of knowledge's prevalence also has the least grounded knowledge gaps. However, probity of the data associated with the Munagalapudu's young men, a cohort only outstripped by their male elders for premium climate knowledge, shows the extent to which the village's restricted access to and availability of climate information creates a dependence on the grapevine and observations even for the young (see excerpt 24). This constrained environment for public knowledge acquisition supports Yang and Ho's (2017) contention that climate knowledge gaps in low capacity contexts constitute "a

social issue that needs collective action" (p. 278).

Excerpt 24: Climate information vacuum creates dependence on the grapevine and observations even for the relatively more informed.

Young Men Focus Group - Munagalapudu, Laya Subset
Interviewer; Are you seen this happening in your village already or you think it is going to happen?
Responder 1: We already seen because we here from childhood, so we see.
Interviewer: Do you talk to your parents and old age people about this change?
Responder1: Yes.
Interviewer: Would they listen to you?
Responder: Even they know about this, they don't talk with agricultural officers or presidents. Because they stay about three months in farms.
Interviewer: Why it is so, working for people, or on your own land?
Respondent 1: They stay in our fields only, but my parents never meet with agricultural officers, never came here.
Interviewer: Did you tell this to your parents go and see to them?
Interviewer: Where did you hear about climate change for the first time?
Respondent 1: Radio.
Respondent 2: Tv.
Respondent 3: Someone from outside.
Interviewer: Who from outside?
Respondent 3: Traders.
Interviewer: Random traders?
Respondent 3: The wholesale market guy. [Crosstalk]. Middle man, he buys from us and sell our product in markets
Interviewer: What did he say, the middle man?
Respondent 3: He tell about predictions on rain fall, explaining about why lost the last year crop. [Crosstalk] Last year I lost the crop because of rain, so he says be careful, rain will come in two days.
Interviewer: What did the middle man tell you last year about crop loss due to the climate change?
Respondent 3: He says that it is because of rainfall.
Interviewer: What you think these heavy rains are because of climate change?
Respondent 3: Rainfall doesn't follow seasons; even other than rainy season we have rainfall.
Interviewer: Middle man is from your village?
Respondent 3: No, he is from outside.
Interviewer: Middle man is from village/city?
Respondent 3: He is from another village.
Interviewer: Middle man is tribe?
Respondent 3: Yes, he is from our community only.

Age and gender significantly account for the prevalence of knowledge in the dataset. Older men, for instance, account for two-thirds (fourof six) of the prevalence for experiential knowledge, while men (young - six of 16 and old seven of 16, respectively) account for more than 80 percent (13 of 16) of a posteriori knowledge's prevalence, which is consistent with the heightened level with which older men are directly engaged across both projects, particularly older men who are culturally vested with the rights and privileges of ownership, leadership and management of assets and resources, relative to other groups. However, circumscribed localities account for much of these observations. Specifically, older men in Pulusumadi (five) and young men in Nallikota (five) account for more than 60 percent (10 of 16) of the prevalence for a posteriori knowledge in the dataset, but this is consistent with the variation with which Laya introduces climate adaptation initiatives across localities, including the nature and extent of its

targeted initiatives that include women and exemplary youth for specific initiatives.

Although women overall have higher levels of prevalence for knowledge gaps (eight of 14 versus six of 14), which is consistent with studies (11 of 16 reviewed by Davidson & Freundenburg (1996)) that have found lower levels of technical knowledge among women regarding environmental concerns, all age groups account for the same level of prevalence for knowledge gaps (four of 14) except young men for whom it is least grounded (two of 14). Young men, the only group for whom a posteriori knowledge exceeds half of the prevalence for knowledge has the lowest level of knowledge gaps, which is consistent with the overall observation of a significant association, but this is because of young men's moderately better access to emerging educational opportunities (basic literacy, numeracy and primary schooling as observed in Munagalapudu where two of the young male respondents reached the 10th standard). Like the observation in the PRAGATI subset of a link between engagement and knowledge levels, population level engagement, which socio-spatially disadvantages women due to time constraints and its usual male membership, is the sole mode of engagement in Munagalapudu for all (see excerpt 25) and even in localities with relatively higher knowledge levels, where this limited engagement modality only affects women, its socio-spatial disadvantages in terms of time and male-centredness affect participation and knowledge levels (see excerpt 27).

Excerpt 25: Population level engagement is the sole mechanism employed in Munagalapudu

Young Men Focus Group – Munagalapudu, Laya Subset
Interviewer: Have they talked with young people separately? Respondents: No, they conduct meeting for whole village. Interviewer: Do you have a youth group? Respondents: No.

Knowledge Acquisition

Table 33: The relative prevalence of initial sources of climate knowledge in India

Subset	Village	Before project		Extreme Event		Friends/Peers		News		Observation		Project Intervention		School		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Laya	Pulusumamidi	0	0%	0	0%	1	11%	0	0%	1	11%	4	44%	3	33%	9
	Nallikota	0	0%	0	0%	0	0%	0	0%	2	100%	0	0%	0	0%	2
	Munagalapudu	0	0%	0	0%	1	14%	3	43%	1	14%	2	29%	0	0%	7
PRAGATI	Agraharam	0	0%	2	20%	2	20%	0	0%	0	0%	3	30%	3	30%	10
	Itikalakota	1	5%	1	5%	1	5%	9	41%	10	45%	0	0%	0	0%	22
	Palem	0	0%	0	0%	2	13%	5	33%	6	40%	1	7%	1	7%	15
	Sunaladana	0	0%	0	0%	1	11%	8	89%		0%	0	0%	0	0%	9
	Totals	1	1%	3	4%	8	11%	25	34%	20	27%	10	14%	7	9%	74

As noted earlier, an assessment of the sources of climate knowledge is likely to indicate the veracity of my hypothesis, particularly the extent to which the information provision of the interventions defines climate knowledge. Overall, there is indeed a wider tapestry of initial climate knowledge acquisition sources associated with the PRAGATI subset (seven compared to five for Laya Villages, per Table 33), which shows lower overall levels of knowledge gaps. However, manifestly credible and formal sources (news, project intervention, school) account for more initial climate knowledge acquisition in Laya villages. This is consistent with the hypothesis that experiential knowledge and its acquisition modality (observation) correlate positively with higher knowledge levels where a broad and accessible tapestry of information is available. Nonetheless, the significant difference in knowledge gaps between PRAGATI and Laya villages amidst distinctions in the nature of their knowledge acquisition sources, such that Laya villages where knowledge gaps are higher are more readily exposed to manifestly credible initial acquisition sources suggests the nature, frequency and scope of available manifestly credible sources may be significant factors. The significance of the nature, frequency and scope of available manifestly credible information is particularly reinforced by the fact that project intervention singularly accounts for more than a third of initial knowledge acquisition in the Laya subset, alongside the earlier observations of cohort level distinctions in climate knowledge

across the subset. Theoretically, this suggests heightened contentions about the decisiveness of frames in response to historical preoccupation with information provision (Moser, 2010; Nisbet, 2009) is contingent upon structural and utility factors (nature, frequency, scope, availability and access).

Specifically, scrutiny of the data reveals that the three main modes of climate change knowledge acquisition for the overall case are News (25 of 74), Observation (20 of 74) and Project Intervention (10 of 74). School (seven of 74) and Friends/Peers (eight of 74) also register significantly. Extreme events and knowledge acquired before the project via unspecified means also register statistically but only in the PRAGATI Village subset. While the top three modes of climate change knowledge acquisition feature both news and observation, they vary in order of rank. The project intervention (formal) is the most common source of initial climate change knowledge acquisition for Laya Villages (one-third prevalence), while it's a distant fourth for PRAGATI Villages (seven percent prevalence) behind News (39 percent), observation (29 percent) and Friends/Peers (11 percent). While observation ranks as the second most important source in both set of villages, it is more grounded in the PRAGATI subset (29 percent versus 22 percent), which is consistent with the inward-looking orientation of PRAGATI Villages observed in their local preference for climate change leadership in spite of the evident knowledge related resource gaps that undermines their climate change agency.

Although news is the most grounded initial source of climate change knowledge acquisition in PRAGATI Villages and school features alongside the project intervention as the fourth most important factors (nine percent each), the combined prevalence of these manifestly credible sources of knowledge (54 percent) is offset by the high prevalence of combined manifestly unreliable sources (39 percent), namely observation (based on the knowledge related

resource gaps) at 29 percent and Friends/Peers/Grapevine at 11 percent. This differs from the scenario observed across Laya Villages, where manifestly credible and formal sources of knowledge acquisition, namely news (17 percent), project intervention (33 percent) and school (17 percent), account for two-thirds of the prevalence for knowledge acquisition. Combined manifestly, unreliable and chiefly informal sources account for one-third of climate change knowledge acquisition in Laya Villages.

PRAGATI Villages

While news, observation and friends/peers are the top three sources of initial climate change knowledge acquisition for the overall PRAGATI subset, at a more granular level, this does not hold true for any single village in the subset. Palem and Itikalaka, which are the only two villages for which all three factors register prevalence in the top three, do so in a slightly varied order but identically (observation, news, peers/friends/grapevine) and at comparable levels—observation - Palem 45 percent versus 40 percent in Itikalakota; news - Palem one-third versus 41 percent in Itikalakota and Peers/Friends/Grapevine - Palem 13 percent versus five percent in Itikalakota). While no other factor shows prevalence in Palem, extreme event (cyclones and floods) and unspecified before project learning are statistically evident in the Itakalikota dataset with identical prevalence of five percent each. Considering the issue-specific response mechanism used to provide climate adaptation information, this may account for the higher level of climate knowledge among older women in this context, who by virtue of their leadership in the domestic sphere, would be directly engaged in relief efforts and the associated outreach activities.

Despite the high overall depth of prevalence associated with observation in the PRAGATI subset, it is absent from the Agraharam (as is experiential knowledge) and

Sunaladana subsets. In fact, friends/peers/grapevine is the only factor in the top three for the overall PRAGATI dataset that is evident in Agraharam with a prevalence of 20 percent. It is also the only village in which the project intervention and school account for the top initial source of climate change knowledge acquisition with a prevalence of 30 percent each. Extreme events, specifically a major flood in 2006, account for the only other factor in this village. This scenario offers strong support for the assertion that the nature, scope and duration of the provision of climate information is consequential. Agraharam benefits from an issue-specific information provision mechanism and has relatively greater access to manifestly credible climate information sources, including the project intervention, yet it is the village with the lowest level of climate knowledge in the PRAGATI subset. This assertion is underscored by excerpt 26, which highlights circumscribed issue-specific climate information provision around an extreme event (Dialogue A) and how a contextual and issue-specific modality can negate knowledge enhancement opportunities through subsistence responses to climate related disasters (Dialogue B).

Excerpt 26: The limited nature and scope of climate information provision

Dialogue A: Older Men Focus Group – Agraharam, PRAGATI Subset; Limited scope of climate information provision	**Dialogue B: Older Men Focus Group, Agraharam, PRAGATI Subset; The intervention's subsistence focus response to climate impact excludes climate information provision**
Interviewer: Have you heard word climate change? Respondents: Yes, we heard the word. Interviewer: Where did you hear first time? Respondent 1: Some NGOs Respondent 2: Some independent organizations conduct meetings and create awareness. Respondent 3: When Godavari overflow I heard the term climate change. [Cross talk] In 2006 Godavari overflow and create heavy damage, we lost our shelter, food and everything. That time government release funds to NGO and they do their services to us, like food supply, blanket supply, etc. Interviewer: Who came and told you climate change is the cause? Respondent 3: Because of cyclone, flooding will take place and we lost our shelter, district officials and village officials are coming and tell us about flood. Interviewer: Who came and told you climate change is the cause? Respondent 3: VRO, MRO and PO will Interviewer: Do you think your village is affected by climate change? Responder 1: Yes, now we are cultivating chilli, if any cyclone or heavy rain take place we lost our fields.	Interviewer: Do you know about PRAGATI? Respondents: Yes, we know. Cross talk: they help us in emergency times and educate us to know about our rights. Interviewer: What they during floods? Respondents: They give food, rice, dall, etc. Interviewer: Did they give any seeds? Respondents: Yes, they give only once. Interviewer: Did they tell why they giving seeds to you? Respondents: Yes. Interviewer: What did they tell you? Respondents: We can get more yield, reduce the water usage and time of crop also decrease. Interviewer: Did ever say anything about climate change? Respondents: No.

This constellation of factors indicates gaps in the scope, nature, degree/duration,

availability and/or accessibility of the climate information offered through manifestly credible sources. However, the nature of the manifestly credible source of climate information may be a distinguishing factor. Specifically, the Sunaladana Village dataset reveals only two sources of initial climate change knowledge acquisition, both of which feature in the top three for the overall dataset (news and friends/peers/grapevine). It is the only village in which news is the main initial source with a prevalence of 89 percent. This means there's a substantially higher degree of prevalence for manifestly credible sources of initial climate change knowledge acquisition, specifically news, in Sunaladana (89 percent), which also has a level of premium climate knowledge on par with all PRAGATI Villages, except the outlier of Agraharam. This accounts for the distinction among young women in Sunaladana in terms of premium climate knowledge observed earlier, as they explicitly cite the news and reading the newspaper (dated editions) as their initial source of climate knowledge acquisition. Elsewhere, combined manifestly credible sources account for 60 percent in Agraharam (30 percent each from school and project intervention); 47 percent in Palem (news – one-third; school and project intervention – seven percent each)); 41 percent in Itikalakota (news, only factor). News' distinction as a source is likely associated with the nature and utility of a range of frames in tackling knowledge gaps. Specifically, whereas the project intervention presents climate change with issue, context and domain specificity that narrows the scope of knowledge provided, news coverage of climate change as a translating process from scientific to public audiences (Boykoff & Boykoff, 2011) is more general and descriptive of a wider range of issues, domains and contexts. This is also bringing into focus Nisbet's (2009) relevant detailing of a range of climatic frames, but contrary to his suggestion of different frames for different audiences, the implication here is that frame specificity may be less effective for attenuating knowledge gaps in particularly low capacity

contexts.

While there is no consistent gendered and age-oriented variation in the credibility of initial modes of climate change knowledge acquisition in the dataset, it is important to note that older interviewees (81 percent), particularly older men (two-thirds of whom are from Palem), account for most of the prevalence for observation in the subset, which is consistent with the high association between experiential knowledge and this older cohort due to the broader range of life and event experiences they can draw from. But comparable levels of prevalence for this measure associated with older women (25 percent) and young men (19 percent) in Itikalakota, who account for the remainder, offers further support for the observation that while significant common-sense notions about the resonance of knowledge sources such as observation among elders should not foreclose opportunities to leverage observation and experiences to attenuate knowledge gaps among some cohorts of youth.

While men account for all the prevalence for manifestly credible sources, such as project intervention in the subset, with equal distribution across age groups albeit varyingly across two of the four villages, women account for just over one-third of the prevalence for news overall but a high of two-thirds in Sunaladana. Though the overall figure is consistent with the assertion that men have more leisure time than women (see excerpt 22), young women, particularly in Sunaladana (18 percent), account for comparable levels of prevalence for manifestly credible sources of initial climate change knowledge acquisition to men of all age groups (27 percent compared to 32 percent for older and younger men, respectively). It is older women who seem to have the least exposure to manifestly credible sources of initial climate change knowledge acquisition. The project's population level approach to information provision (access availability) and disparate focus during gendered engagement (frames) are explicitly faulted for

this by young women in Palem (see excerpt 27).

Excerpt 27: Population level engagement and disparate focus during gendered engagement undermines women's climate knowledge

Young Women Focus Group – Palem, PRAGATI Subset
Interviewer: Did they all say the same? I need new ones. Can we do anything about climate change?
Respondents 1: We can't do.
Respondents: 2, 3 & 4: No.
Interviewer: No. Oh! Okay. Has PRAGATIi talked about... Why can't we do anything about climate change?
Respondents 1: Because we don't know what it means.
Respondents: Don't know.
Interviewer: Because you don't know. Okay, good. Has PRAGATI ever talked about climate change?
Respondents 1: Maybe they told the men. We did not hear. They stay with the men most of the time.
Interviewer: Oh okay, okay. Do you go to the meetings of PRAGATI?
Respondents 2 & 3: Yes.
Interviewer: How often?
Respondent 1: Women mostly go to DWCRA [Development of Women and Children in Rural Areas] meetings generally. Because they happen early in the morning.
Interviewer: Oh, so they also meet with the men and women separately to discuss separate issues?
Respondent 1: Ahh [vocal cue of affirmation]
Respondent 2: Yes.
Respondent 3: Men as men and women as women.

Also, young people, particularly young men in Agraharam (three of four), account for all the prevalence for school. Young women in Palem account for the remaining prevalence (one in four). This correlates with the changing nature of society where educational opportunities are opening up for youngsters but in a manner consistent with the broader socio-cultural realities that accords educational and other benefits to men rather than women. This is underscored by similar observations in the Laya subset. In Pulusumamidi, the only village where school captures prevalence as an initial source of climate change knowledge acquisition, it is only men—specifically young men—who cite this, which, as observed, may be indicative of broader socio-cultural realities that accord educational and other benefits to men rather than women.

Laya Villages

Overall, project intervention (33 percent), observation (22 percent), school and news (17 percent each) are the most grounded sources/modes of climate change knowledge acquisition. Friends/Peers/Grapevine is the only other statistically significant mode in the subset with prevalence in excess of a tenth (11 percent). However, Munagalapudu is the only village in which all four factors (and news in particular) are featured and in a varied order, as news (43 percent) shows the highest prevalence, followed by project intervention (29 percent) and

observation and friends/peers/grapevine with prevalence of 14 percent each. This underscores a high degree of prevalence (71 percent) for the combined manifestly credible initial sources of climate information (namely, news 43 percentand project intervention 29 percent), marginally less than Pulusumamidi, where these manifestly credible sources are most grounded (78% percent). Consistent with my observation about the likelihood of consequential gaps in the scope, nature, degree/duration, availability and/or accessibility of the climate information available and accessed through manifestly credible sources in these contexts, both of these villages also demonstrate the highest level of knowledge gaps in the Laya subset and at comparable levels (44 percent and 43 percent in Munagalapudu and Pulusumadi, respectively). The import of nature and scope of information provision is also underscored by a dependence on the grapevine with little depth and credibility as observed in excerpt 24.

This is especially important for understanding the efficacy of the ideational affordances of the interventions. Like Agraharam in the PRAGATI subset, Pulusumamidi, which essentially ties with Munagapalpudi for the most intractable level of relative knowledge gap in the Laya subset, is the only village in the subset where project intervention is the dominant mode of climate knowledge acquisition (44 percent). As noted, the project-level information provision modality is narrowly framed in response to context, issues and domain. Meanwhile, Nallikota, which shows no prevalence for manifestly credible sources of climate change knowledge acquisition and only records prevalence for observation, has the lowest level of knowledge gap in the Laya subset. Considering the similarity in education levels across the villages, alongside the positive correlations noted between observation and experiential knowledge and knowledge levels, this strongly suggests a measure of credibility in significant forms of experiential knowledge and observation as a mode of climate knowledge acquisition. However, there is also

strong evidence that knowledge gaps in this dataset are associated with the nature and scope of the information provision mechanism employed by Laya akin to those observed in the PRAGATI subset. The project intervention is likely absent from the Nallikota dataset as an initial source of climate knowledge acquisition because of Laya's employment of a population level subsistence frame in its climate resilience building responses, such as seed-dispersal to encourage multi-cropping. As excerpt 28 shows, the subsistence frame is often devoid of relevant supporting information such that beneficiaries of a climate resilience building activity do not perceive and/or know it as such.

While there is no consistent gendered variation in the credibility of initial modes of climate change knowledge acquisition in the dataset, it is important to note that older men account for all references to project intervention in Pulusumadi, but older women account for all references in Munagalapudu. This is consistent with the variation with which Laya implements initiatives that specifically targets specific cohorts such as women. But it is men (mostly older - three-quarters), who account for all the prevalence noted for news. Though statistically small, it correlates with assertions by older women in Nallikota (and their peers in Palem, see excerpt 22) that men generally have more leisure time. This suggests social constraints that undermine access to and the availability of a wide tapestry of credible climate information sources, including news and the frequency with which women and youth can participate in population level engagements, are significant factors.

In Munagalapudu, for instance, though women sampled cite the project intervention as their dominant initial source of knowledge, they also stoutly report the fact that mostly men are aware of activities as they often miss meetings due to other obligations. This infrequent exposure to the information provision sessions offered by Laya may account for the correlation between

maximal levels of knowledge gaps relative to other measures of climate knowledge for this cohort of women alongside their entirely manifestly credible initial climate knowledge acquisition modality. Conversely, the older men in Pulusumadi, who have access to a broad tapestry of manifestly credible initial sources that transcends the project with its circumscribed focus on the activities it prioritizes, exhibit one of the highest levels of premium climate knowledge (a posteriori). Conversely, the limited range of credible climate information acquisition sources available to young women is underscored by young women from this locality (see excerpt 29). These observations underscore the view that addressing climate change, even through adaptation, is a complex socio-cultural and political issues (Moser, 2014; Pelling, 2011).

Excerpt 28: Climate resilience responses with a subsistence frame devoid of information undermines recognition of actions and knowledge

Older Women Focus Group - Nallikota, Laya Subset
Interviewer: When did you hear term climate change? Respondents: We never heard the term. Interviewer: What about the Laya project, what do they do? Respondents: They give us plants to cultivate, they supply cooking equipment (stove) and water filters. Interviewer: When you were given this, they didn't tell about climate change? Respondent 1: They didn't say. Respondent 2: We don't know clearly [if] they say or not. We are busy with day-to-day activities. Interviewer: When Laya came giving seeds, did they ask if you wanted seeds or did they give directly? Respondents: They ask us and give seeds, give us pulses, vegetable, seeds, etc. Interviewer: Did they ask men and woman or only men when giving the seeds? Respondents: They ask us both men and women.

Excerpt 29: Limited and infrequent access to climate information among young women

Young Women Focus Group - Pulusumamidi, Laya Subset
Interviewer: Have you ever heard the term climate change? Respondents 1: No Respondent 2: Yes Respondent 3: No Interviewer: You heard [to R2]. Where did you first learn about climate change? Respondent 1: Here only, in this village only we heard. The rain will come, the clouds. In the village generally some people talk, so I heard those words. Respondent 2: Outside they talk, and I heard. Interviewer: When was this? Respondents: We heard when the people were talking about five to six years back. Interviewer: Was it a village meeting? Or just random people in the village? Respondents: No. When all were just talking, we heard.

Signs and Indicators

Table 34: The relative prevalence of signs and indicators of climate change in India.

Village	Crop Yield/Soil Health		Health		Pollution		Socio-Cultural Change		Soil Erosion		Weather		Density
	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Pulusumamidi	11	42%	2	8%	1	4%	0	0%	1	4%	13	50%	26
Nallikota	8	47%	4	24%	1	6%	0	0%	0	0%	5	29%	17
Munagalapudu	10	67%	0	0%	0	0%	1	7%	0	0%	5	33%	15
Agraharam	11	61%	0	0%	0	0%	0	0%	0	0%	7	39%	18
Itikalakota	10	53%	1	5%	0	0%	0	0%	0	0%	10	53%	19
Palem	25	71%	2	6%	0	0%	1	3%	0	0%	17	49%	35
Sunaladana	11	61%	3	17%	0	0%	0	0%	0	0%	6	33%	18
Totals	**86**	**58%**	**12**	**8%**	**2**	**1%**	**2**	**1%**	**1**	**1%**	**63**	**43%**	**148**

A closer look at the nature and range of signs and indicators, a measure of climate knowledge and operationalization, strongly suggests that the high overall level of knowledge gaps observed in the dataset is associated with the nature, scope and duration of climate information provision and availability. Comparatively, the prevalence of signs and indicators of climate change in both villages are on par with what is observed in the Fijian villages with weaker climate ideational exposure. Per Table 34, Laya Villages, which benefit from more explicit ideational work, show six core signs and indicators of climate change, compared to four in the data set associated with PRAGATI villages, which benefit from a more unstructured and contingent issue-specific mechanism. This compares to eight and seven in Seaqaqa and Yaqaga, respectively, in the Fijian subset. Notwithstanding the smaller range of signs and indicators perceived in this case, which is associated with knowledge levels, the highly proximal, immediately discernibility contradicts assertions in the extant literature that communicating climate change is distinctly challenging because of the "invisibility of causes, distant impacts and a lack of immediacy and direct experience of impacts" (Moser, 2009).

Overall, crop yield (58 percent), weather (43 percent) and health (eight percent) are the signs and indicators with the greatest prevalence. Socio-cultural change (1.4 percent), pollution (1.4 percent) and soil erosion (0.68 percent) are the only other discernible indicators with relative

prevalence. These indicators have almost identical prevalence in both set of villages. The direct relationship between weather, crop yield and soil erosion, as well as health strongly underscores a dominant food security frame and highly palpable health frame in these contexts. The dominance of these manifest climate perceptual markers (linking climate variability and rainfed agriculture, as well as various vector-borne maladies) is consistent with the livelihoods focus of both project interventions and the direct existential impacts being experienced. This clarifies the relative primacy of observation as a knowledge acquisition source (second overall) and experience in structuring knowledge articulation (third overall). The consonance with experience and subsistence also indicates that articulation of climate change signs and indicators is not solely dependent on climate knowledge.

The similarities in climate perception across both set of villages offer strong reinforcement for these observations. While Laya villages have a slightly higher variation in the number of indicators, that is entirely attributable to the fact that they account for the entirety of the prevalence of relatively marginal signs such as pollution (two) and soil erosion (one). However, this greater variation in signs and indicators in Laya Villages is consistent with the researcher's observation of more explicit ideational work compared to PRAGATI. This justifies a more granular look at the village level dataset to identify, if this correlation holds.

PRAGATI Villages

Overall, there's little discernable difference in total signs and indicators across PRAGATI Villages, with the exception of Palem, which is accounted for by the exceptional case of the young men focus group (Sunaladana - 18, Agraharam - 18, Itikalikota - 17, and Palem - 35). These young men account for the greatest level of prevalence of signs and indicators (18 of 90) and the broadest range (four) compared to an average of two among all other PRAGATI villages. This is consistent with the maximal premium climate knowledge observed among this cohort

relative to other knowledge markers. As indicated earlier, this cohort's distinction is significantly accounted for by a single participant, who was one of four youth identified by their elders to participate in "deeper explanations" through capacity building efforts led by PRAGATI that focused on crop diversification and resilience (see excerpt 19). This offers strong support for the observation that substantial explicit climate change ideational work, including information provision and training, positively impacts climate knowledge, paves the way for improved perception of interventions and personal influence, identification and participation in actions, risk perception, agency, motive and leadership.

Laya Villages

This engagement thesis is supported by data associated with Laya villages and partially accounts for the broader variation of signs observed. For instance, pollution, which is grounded twice in the dataset, was mentioned once in two different villages by different population groups (older men in Pulusumadi and young men in Nallikota). As observed earlier, both cohorts account for more than 60 percent of prevalence for premium climate knowledge for the subset, which allows them to identify and link cause and effect more readily. The older men of Pulusumadi also account for the totality of project intervention as their initial climate acquisition source and likely received disproportionately more exposure to the information and training offerings by Laya due to the socio-spatial bias of population level engagement towards men at the village level. This observation is reinforced by the overall higher prevalence of signs and indicators among men sampled, except those in Munagalapudu which is consistent with the overall lower prevalence of signs in the village (15) compared to all other Laya Villages (Pulusumadi - 26 and Nalikota - 17) and all villages in the Indian case overall. In fact, they note the least number of signs (three) in the entire subset except for older women in their village.

Excerpt 24, which illustrates the climate information vacuum in this context, also highlights some of the mobility constraints that limits older men and women from accessing agronomic related climate information and support.

With respect to the young men of Nallikota, like the rest of their village, they do not cite any manifestly credible sources as their initial climate knowledge acquisition source, but they have benefited from Laya's selective and variable cohort engagement strategy through the establishment of a youth group, which affords them exposure to climate information provision and the ability to represent their concerns at both the village and mandal levels (larger cluster of localities below the district level).

Similarly, socio-cultural change and soil erosion are the only other statistically significant signs noted. While socio-cultural change is accounted for by different cohorts across the two subsets, young men in Palem (PRAGATI subset) and an older male from Munagalapudu (Laya subset), both cohorts are distinct for the absence of knowledge gaps, alongside sustained access to manifestly credible initial sources of climate information (news for older men in Munagalapudu, direct project engagement for the young men in Palem) that accounts for the totality of how they acquire climate knowledge. In both instances, the perceived socio-cultural alterations indicate changing levels of regard and respect for the traditional order and attrition in discipline levels. Though statistically marginal and seemingly indicative of a knowledge gap, they comport with observations of shifts in confidence away from the traditional and communal order that accords benefits to youth due to their perceived educational advantages (basic literacy and numeracy), as established in subsequent sections of this analysis. So, the real implications of these interconnections for cultivating climate agency and mobilizing action accords credibility to the articulations of socio-cultural changes as a sign of climate change, specifically a way in

which its impact manifests and exacerbates a socio-cultural challenge of critical proportions. In this sense, it functions as a subjective social limit to adaptation (Adger et al., 2008).

This strong support for the observation that substantial explicit climate change ideational work, including information provision, training and direct engagement of cohorts, positively impacts climate knowledge, perception of inclusion and influence, and the overall intervention, is highly significant. Probing the range and nature of climate actions observed by the study populations will further illustrate knowledge operationalization, alongside the scope and efficacy of project level information provision and action that can simultaneously illuminate the intractable level of overall knowledge gaps observed and its relationship with the limited scope of overall climate change information provision across both projects.

Excerpt 30: Demonstration of climate knowledge and a range of signs and indicators

Young Men Focus Group- Palem, PRAGATI Subset
Interviewer: So, changes in the weather, anything else? That is one, anything else comes to mind for you? If it is the same thing, just repeat that it is the same thing, or just say it again. Respondents 3: People are not staying the same. Respondent 4: We are not getting the yields like before. [Crosstalk] The crops used to grow well then, now they are not growing. The weather has changed a lot. Interviewer: How do you think your village is being affected by this change in the weather and climate change in general? Respondents: In the rainy season to walk around it is difficult. Interviewer: Any other way? Respondents: [Crosstalk] That is different, this is different. What problems in rain he is asking? In rainy season we get health issues malaria, typhoid, malaria, typhoid. Mosquitoes. Water stocked in places and mosquitoes. Interviewer: What kind of diseases? Respondents: Malaria, typhoid, fever, elephantiasis, cerebral malaria is less. We get. Interviewer: For you guys [directed at other participants], is there anything happening on the farm? Anything climate change is causing there? Having any issues there? Any problem on your farm that you think climate change is causing it? Respondents: [Crosstalk] Because of changing weather, there is no rain in proper time after growth. […] Respondents: People are having problems […] Respondent 2: Problems on the farm, when the flowering comes, insects come. With heavy rainfall and water storage the crop gets destroyed Respondent 3: With no rains the flower also drops

Excerpt 31: Engagement gaps and limited demonstration of climate knowledge and signs perceived

Older Women Focus Group - Pulusumamidi, Laya Subset
Respondents: Green farms is one issue (Saplings on the field), green farms only. If there is rain, it is creating a problem. Green gram, Red gram are sprouting now. The Red Gram is now flowering well, it will get spoilt if there is rain. That is an issue. On Cotton farm, the fruits are breaking open. If there is rain, the fruits become black and get spoilt. [Crosstalk] The fruit gets spoilt and there is no flowering. Next is the Paddy fields, the fields with abundant water are fine. For the farms not having any water, if there is no rain, the farms dry up and we can't spray any fertilizers also. Interviewer: And, has anybody talked to you about these problems that you are having? Respondent 1: What? Respondent 2: No one told us. Interviewer: No one. Are you familiar with Laya? Respondents 1, 2 & 3: Yes. [Crosstalk] Laya means… we know about them. But, we do not know what programmes and all. Interviewer: And Laya never talked to you about the, and Laya hasn't talked to you about these problems you are having on the farm? Respondents: No, Sir.

Climate Actions

Table 35: The relative prevalence of climate actions identified by study populations in Indian villages

Subset	Village	Crop Diversification		Filters & Water Supply		Hydropower		Inaction		Irrigation		Land Development		Multi-Cropping & Seed Dispersal		Planting Trees Afforestation		Soil Enhancement		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Laya	Pulusumamidi	0	0%	0	0%	0	0%	26	48%	0	0	0	0%	18	33%	3	6%	7	13%	54
	Nallikota	1	6%	2	13%	0	0%	2	13%	0	0	0	0%	10	63%	0	0%	1	6%	16
	Munagalapudu	0	0%	7	18%	5	13%	13	33%	0	0	0	0%	11	28%	0	0%	3	8%	39
PRAGATI	Agraharam	1	6%	0	0%	0	0%	6	35%	0	0	0	0%	9	53%	0	0%	1	6%	17
	Itikalakota	0	0%	0	0%	0	0%	9	60%	0	0	4	27%	0	0%	0	0%	2	13%	15
	Palem	0	0%	0	0%	0	0%	11	28%	1	0	6	15%	6	15%	5	13%	11	28%	40
	Sunaladana	0	0%	0	0%	0	0%	11	52%	0	0	6	29%	3	14%	1	5%	0	0%	21
	Totals	**2**	1%	**9**	4%	**5**	2%	**78**	39%	**1**	0	**16**	8%	**57**	28%	**9**	4%	**0**	0%	202

Nine of the 13 codes denoting climate change actions are varyingly grounded in the India case (seven in each set of villages). Per Table 35, they include: crop diversification, filters and water supply (Laya Villages only), hydropower (Laya Villages only), inaction, irrigation (PRAGATI Villages only), land development (PRAGATI Villages only), multi-cropping, planting trees and soil enhancement. Inaction is the most grounded analytical unit in the case overall (39 percent). The high relative prevalence of this marker of climate action is highly significant as it specifically captures declarations that there is no climate action underway in the village, in addition to little or no mention of the phenomenon and how it affects the area during the intervention. It is directly associated with the intractable levels of overall knowledge gaps (more than one-third for Laya Villages and approximately a quarter for PRAGATI Villages) since both village subsets are exposed to interventions that have declared climate adaptation and mitigation activities with disparate population level reach through varying means across localities. This is especially significant as perceived inaction, which suggests considerable gaps in knowledge levels and knowledge operationalization, is evident at comparable levels in both sets of villages (38 percent in Laya Villages compared to 40 percent in PRAGATI Villages). The marginally higher levels of climate action observed in the Laya subset is consistent with the

higher relative prevalence of the project intervention as a knowledge acquisition source in the subset. Crucially, the strong association between knowledge gaps and failure to recognize climate actions in these contexts is contrary to Leiserowitz's (2003) finding that there is no significant relationship between accurate knowledge of climate change causes and responses among Americans. The manifest relationship between the range of climate resilience building and coping agronomic and resource management activities underscores the consequential nature of the climate knowledge gaps.

While multi-cropping (28 percent) and soil enhancement (12 percent) are the second and third most grounded climate actions noted by the overall study population, their order of importance varies. While the order holds true for Laya Villages (inaction (38 percent), multi-cropping (36 percent) and soil enhancement (10 percent), the latter is only the fourth most grounded action in the PRAGATI subset (15 percent). Inaction (40 percent) and multi-cropping (17 percent), which are similarly ranked in each subset; and land development (17 percent), which is only evident in this subset, are more grounded. PRAGATI Villages also account for the only instance of irrigation evident in the data, whereas Laya Villages account for all the prevalence for filters and water supply and hydropower. These variations are consistent with the contextual nature of climate change impacts and the location specificity of actions necessitated. Planting trees (five percent) and crop diversification (less than one percent) are the only other statistically significant climate actions in terms of prevalence that are common to both set of villages. They are also similarly grounded in each set of villages. Notwithstanding these contextual variations, it is important to underscore the thematic consistency between the primary climate actions and the primary signs and indicators perceived by the populations and their direct relationship with the most elemental concerns/needs of the study population: food security and

subsistence challenges. Specifically, multi-cropping is the most grounded specified activity in both subsets and when considered against all other actions directly associated with food security in each subset (crop diversification, soil enhancement and land development), this theme that underscores action accounts for a heightened majority (53 percent) and a plurality of actions (47 percent) in PRAGATI and Laya villages, respectively.

However, there are significant variations across localities within both subsets that reinforce the observations proffered about the importance of substantial explicit climate change ideation work, including information provision, training and direct engagement of cohorts, for improved climate knowledge and its effective operationalization.

PRAGATI Villages

While inaction shows the most prevalence of all codes indicative of climate action in the PRAGATI subset, it varies widely across villages (a high of 60 percent in Itikalakota, 52 percent in Sunaladana, 35 percent in Agraharam compared to 28 percent in Palem). The disproportionately higher level of inaction observed in Itikalakota is directly associated with the differential level, scope and nature of PRAGATI's engagement with different villages, as well as the paucity of accompanying information, which is consistent with the subsistence-frame observed earlier. Specifically, much of the climate inaction noted in this context is underscored by specification of engagement on other measures of livelihood enhancement and coping. Older men in Itikalakota, for instance, note rarely encountering proponents of the project and only receiving a fifth of their request for kallu, the fruit of the palm tree, under a seed dispersal initiative. But gaps in the information provision mechanism is also a factor as where broader livelihoods receipts are noted as being received from PRAGATI's partner organization, ITDA, they are still not perceived as climate actions, in large part because of the subsistence-response frame employed, which the data suggests is devoid of accompanying information (see excerpts

32 and 26).

Conversely, the much lower overall level of engagement in Palem is underscored by significant levels of targeted engagement on integrated action, including direct engagement and training of young men. So, context, both as a consequence of the manner and extent to which climate change impacts are evident in a village and differential pursuit of climate activities across villages are primary factors in structuring perception and reporting of activities as climate actions in these contexts. This is consistent with the positive correlation between substantial experiential knowledge/observation as a knowledge acquisition source and higher levels of premium climate knowledge (a posteriori).

Excerpt 32: Subsistence climate response frame devoid of accompanying information precludes recognition of climate action

Older Men Focus Group – Itikalakota, PRAGATI Subset
Interviewer: Are you familiar with ITDS? Respondents: Yes. Interviewer: Do you think them doing good work? Respondents: Yes. Interviewer: How you benefited from ITDS? Respondents: Land development, land levelling, they helped us floods [Cross talk] They [are] helping us depending their budget sum of our villagers are benefited from ITDS and they said others will benefited in second turn. They [are] supporting us. Interviewer: Do you have own land? Respondents: Yes. Interviewer: Have they talked about climate change? Respondents: No. Interviewer: Would you like to talk about climate change? Respondents: We feel good. Interviewer: Have they given any seeds to you? Respondents: No, we got seeds from government. Interviewer: Did they teach you how to do farm? Respondents: We know from my childhood because our family is agriculture family. Interviewer: Did they give any tips to you? Respondents: No. Interviewer: Have they talked about weather changes? Respondents: No. Interviewer: Are you familiar with cashew planting them doing that? Respondents: Yes, but we didn't receive cashew plants/seeds. Interviewer: Did you think they are doing work? Respondents: Yes.

Variations in prevalence for perceived markers of climate activity reinforce the observation of the consequential nature of contextual impacts and differential implementation of actions. Although land development, multi-cropping and soil enhancement are the three most grounded climate actions in the PRAGATI Villages overall, none of the villages show prevalence for all three. Multi-cropping, the most grounded specified action, is absent from the

Itikalakota dataset and is most grounded in Agraharam (nine of 17), the only village where a specified action accounts for the majority of prevalence for climate action. Similarly, land development is absent from the Agraharam dataset but shows comparable prevalence across the three villages where it's evident (38 percent in Sunanalada and Palem and 25 percent in Itikalakota). Soil enhancement is also absent from one village (Sunaladana) but is almost entirely accounted for by Palem (79 percent). These variations are indicative of the contextual nature of the climate change activities people are likely to pinpoint, as further illustrated by the fact that prevalence for all other specified actions is even more associated with circumscribed cohorts in discrete localities—specifically, planting trees: two villages - Palem five of six and Sunaladana - one of six; irrigation -Itikalakota only, (one of one) and crop diversification: Agraharam only (one of one). As observed, this contextual factor is at one level due to distinctions in how climate change-induced changes and variability differentially affect localities such that those with already limited access to water (Itikalakota) are rendered more disadvantaged and active on that measure. Also, it offers robust support for the contextual engagement factor as many of these activities are technical (e.g. soil enhancement) and would necessitate special training/capacity building that resource constraints would only permit offering to a select group, such as the young men in Palem, who benefited from such (see excerpt 19), which credibly explains the village's distinctions.

Gender and age feature more significantly in the nature of climate actions noted across PRAGATI Villages, but not in a manner that is determinative. Consistent with observations of lower knowledge levels and a narrower range of climate knowledge acquisition sources of manifest credibility, alongside the socio-spatial barriers to their participation in population level engagement and information provision, women account for the greatest of the prevalence for

inaction in PRAGATI Villages (57 percent), particularly young women (32 percent). This obtains in all villages except Itikalakota, where older men account for the majority of inaction's prevalence (56 perent) and women only account for one-third. The gendered differentiation in Itikalakota is associated with direct engagement of women in this village through training programmes. But, overall, the fact that young men account for a fairly comparable level of prevalence for inaction overall (19 percent compared to 32 percent for young women), suggests there's a youth dynamic at play in the PRAGATI subset. This may be attributed to the fact that older men are more likely to be engaged about village matters and older women were in this rare instance the beneficiary of a targeted training programme. Further, these women exhibit a maximal level of premium climate knowledge relative to other knowledge markers that is largely associated with observation (80 percent prevalence), which underscores the contention that observation and experiential knowledge correlate positively with improved knowledge where sustained and manifestly credible climate information is provided and accessed. The implication here is that it also positively structures knowledge operationalization, specifically the identification of climate actions.

Despite the cohort level dynamics observed, no single group accounts for the majority of the prevalence of all specified actions. Women account for comparable levels of prevalence for all actions or outpace the level accounted for by men. Even for land development, a traditionally male-oriented task, women account for seven of 17 compared to nine of 16 for men and outstrip men for the prevalence of soil enhancement (nine of 14 versus five of 14). Men, however, account for more of the prevalence for tree planting (five of six), but youth, particularly young men, account for most of this prevalence overall (four of six and three of six, respectively), which is consistent with the tendency to task young men with more labour-intensive tasks due to

their relative fitness. A similar youth association is also evident in the prevalence for land development, where youth account for nine of 16, but young women account for slightly more than young men (five of 16—equal to older men, versus four of five). However, it is the converse for soil enhancement, where older folks outstrip younger folks for the prevalence noted for soil enhancement (nine of 14, particularly older women who account for nearly half (six of 14). This differs for multi-cropping, for which there is an equal split across mixed gender age-groups (youth versus older) and both young men and women have similar levels of prevalence (four of 18 and five of 18, respectively), which is consistent with the heightened perceptibility and reach of the food security concerns and efforts to tackle them.

Laya Villages

The Laya subset offers considerable support for the contextual implications of climate action perception and identification on both dimensions (varied climate impacts and differential activities across localities) and associations with knowledge levels. While inaction is a common theme overall, Nallikota is distinct. Inaction only accounts for 12.5 percent of the prevalence for climate action in the village, compared to nearly a half in Pulusumamidi and one-third in Munagalapudu. Nallikota's distinction is consistent with the availability of cohort level engagement through a youth group, which affords young men exposure to climate information provision and the ability to represent their concerns at both the village and mandal levels (larger cluster of localities below the district level). Further, the village also reports the highest level of premium climate knowledge in this subset and the lowest amount of knowledge gaps. This reinforces the view that while variable implementation of activities and variation in climate impacts influence declarations of inaction, climate knowledge level is a likely more enduring factor, particularly as both interventions have multi-layered climate adaptation and mitigation

activities at their core.

In terms of action specificity, multi-cropping, which is the second most grounded climate action for Laya Villages overall, is the most grounded in Nallikota (63 percent), compared to a third in Pulusumadi and 28 percent in Munagalapudu. Nallikota also accounts for the only instance of crop diversification as a climate action in the dataset. Consistent with its significantly higher level of inaction, fewer specific climate actions are grounded in the Pulusumamidi dataset (four: multi-cropping, planting trees and soil enhancement) compared to the other Laya Villages (four each: crop diversification - Nellikota only, hydropower - Munagalapudu only, filters and water supply, multi-cropping and soil enhancement.

As observed, earlier, that the variations in specific actions are particular to circumscribed localities, which is indicative of the contextual nature of the climate change actions people are likely to identify. While multi-cropping is the single most common specific action across all villages, actions associated with the challenges in the particular localities seem to follow varyingly. Soil enhancement (seven of 54) and planting of trees (three of 54) are the only other factors grounded in Pulusumamidi, with the latter only showing prevalence in this subset. Similarly, while filter and water supply are noted as the second most grounded specific climate action in both Nallikota (two of 16) and Munagalapudu (seven of 39), the next most grounded factor in each village only shows prevalence in their specific dataset (hydro-power in Munagalapudu (five of 39) and crop diversification in Pulusumamidi (one of 16) because of the incorporation of these particular activities in the localities. Rudimentary climate actions such as soil enhancement, which is the third most grounded specific climate action for Laya Villages overall, is ranked the same with nearly identical prevalence in both (eight percent in Mungalapudi and six percent in Nallikota). This contrasts with what is observed in

Pulusumamidi, where it is the second most grounded specific climate action with a prevalence of 13 percent.

While gender does not correlate with any major variance in the climate actions noted at a general level, this masks substantial gendered differences at a more granular level. Overall, women account for the majority of prevalence for inaction (63 percent), but this should be considered an outlier as the gendered dissonance is largely accounted for by Pulusumamidi, where women account for more than three-quarters of the prevalence for inaction in the village and nearly half for all PRAGATI Villages (20 of 41). However, it is important to note that the age of women in Pulusumamidi does not account for this, as young and older women equally account for this strong level of prevalence for inaction (10 of 26 each). The importance of this observation is heightened by the fact that even in Nallikota, where inaction is least grounded, it is women who account for the entirety of its prevalence. Munagalapudu differs as older men account for the majority (eight of 13) of inaction's prevalence in that subset, which is consistent with the fact that their female counterparts are decidedly more engaged with the project, accounting for all prevalence associated with the village for project intervention as an initial source of climate knowledge. The gendered distinction is further reinforced by the fact that, overall, older men account for the greater prevalence for all specified actions (multi-cropping: 17 of 39), soil enhancement (six of 11), hydropower (three of five), planting trees (two of three) and crop diversification (all), except filters and water supply, for which women account for over half of its prevalence (56 percent). The latter is consistent with water's direct importance for women's duties within and dominance of the domestic sphere, but more broadly, these observations strongly support the view that the nature and scope of engagement structures climate knowledge and climate knowledge operationalization. Specifically, people and groups—

particularly women—with little, lower and/or no engagement or access to climate information less readily identify activities underway in their locality as climate actions, even where they acknowledge participation or benefits of even manifestly climate adaptive and/or mitigative actions.

So important is the nature and scope of climate information provision for knowledge accrual and mobilization in terms of recognition of climate action that older men in Munagalapudu, who exhibit the lowest level of knowledge gap, are the least knowledgeable locality in the subset. They easily cite inaction on climate change while readily stating a litany of comprehensive climate resilience building efforts, ranging from agronomic support to clean energy (see excerpt 16). The distinguishing factor seems to be the absence of associated information and explanation. The gendered manifestation of this scenario that particularly benefits older men is reinforced by the fact that while there is a discernable difference in the depth of climate actions noted by older men and younger men—which still accrues benefits to younger men relative to younger women through associative work groups and privileged access to training where a youth focus is employed— is that there is no statistically significant trend pointing to similar differences and opportunities between older and younger women because of the near uniform absence of broad-based engagement of women. The underlying factor here is socio-cultural, as men are customarily privileged with property rights, which means older men are usually owners of the land and inevitably more likely to be primarily and directly engaged for adaptive and mitigative actions in a resource-intensive context.

Excerpt 33: The enactment of multi-level agronomic and clean energy adaptive and resilience building actions without accompanying information undermines perception and understanding of climate actions

Older Men Focus Group – Munagalapudu, Laya Subset
Interviewer: Can you tell me some of the things that Laya is doing in the village? What are some of the things they're working on? Respondents: Here sir, they did some work related to agriculture, some days they worked on water issue, next they saw that we are facing many issues, they did the power station also. Respondents: **Crosstalk** Respondents: Some work they are doing sir. They did 3 works sir. Seeds they gave. Respondents: Seeds, beans, bottle gourd, seeds they gave. Respondents: Turmeric they gave, ginger, sweet potato.

Respondents: They gave brooms also.
Interviewer: What about power? I see multiple connections.
Respondents: ** Crosstalk about the background of how the power station came into the village**
Interviewer: So, you had hydropower from Laya and now there is regular, regular fossil fuel power?
Respondents: That is the power thing that Laya people built (pointing to hydro power mechanism). After that these powerlines from outside came.
Respondents: *Crosstalk**
Interviewer: What was that?
Translator: Before, Laya supplied power from this local power station. Now government has supplied regular power and agriculture and also for the water they worked upon.
Interviewer: What did they do for the water?
Respondents: They put pipes, sir. They put pipes and put filters and asked us to take water from these filters. Because the water we get is muddy.
Interviewer: Great, he [pointing] was saying something.
Translator: The pipes, the pipes water they gave them.
Interviewer: Is there anything else you wanted to say?
Respondents: [Crosstalk] They gave that only, sir.
Interviewer: Same. Okay.
Respondents: That is what they did sir. They did good works only sir. We faced lot of problems sir, now as they did that water …. We don't need to go to the canal and bring water […]
Interviewer: Ahh, so, before, do you think your water problem is a climate change problem or it's just a…. what do you think? What do you think caused your water problem?
Respondents: It is because of that only, sir., In summer it is getting dried up and we are having issues. Now we don't have issues as we are getting water in summer also because Laya people have built this.
Respondents: Yeah, based on the weather only this water is also changing. Because there is nothing else that is influencing, the water is reducing.
Interviewer: What water? What, what water? Water in the pond, water from where?
Respondents: The pond water, sir.
Respondents: Pond, sir.
Interviewer: So, he is saying this [pointing]; what are you saying?
Translator: He was also saying the same.
Respondent: So, what do you think is causing that?
Respondents: It is due to the weather only, sir, because on the ground (Inaudible). The water content in the ground reduces.
Interviewer: So, the soil is retaining enough water and the water table is going down? And you think...(Mumbling). Hmm, the, you said that Laya used to do the pumping of the… hydro and then the government did the electrical stuff? Which do you prefer? Do you prefer the hydro, or do you prefer the government power?
Respondents: Now one thing sir, we feel that what Laya people gave is good. Now the government also supplied. So, we started using that as we felt it will not be good [referring to intermittence]. Both are good sir. When we don't have power in one, we use the other.
Respondents: [Laughs] But, previously Laya people only supplied first. Government did not do.
Interviewer: So, it is intermittent?
Respondents: Sometimes it doesn't come. When a tree falls, or some problem somewhere we will not have power two, three or four days. The power comes with these gaps.
Interviewer: Yeah, but my question is: Which do you prefer? Do you prefer the hydro or do you prefer the government supply?
Respondents: Both are good only, sir. When we do not have supply in one, we use the other.
Translator: Which is more beneficial?
Respondents: Both sir, but, Laya is better as it is free. We have to do, sir. Government supply, we have to pay 100 rupees or 60 or 70. We are paying, we cannot help it. We cannot leave what we got sir, so using it.
Respondents: If there is any issue in Laya power supply, we collect 10 rupees from each house and get it repaired. It is our decision.
[…]
Interviewer: Does anybody disagree? Does anybody have another opinion? You don't have to all say the same thing.
Translator: Just because he told, you don't need to same. Tell what you feel is right.
Respondents: We think both are good, sir. Don't we? We are using both equally.
Interviewer: Just a minute, minute… We have to manage it more. Because it's for everybody.
Interviewer: Is anyone more reliable than the other?
Respondents: Laya will be there continuously. It will not change. If we do something, then it will be a problem. Government we don't know as it is supplied from outside?
Respondents: Because Laya supply is not cut off it is better
Interviewer: How is Laya thing pumped? Is there any… gasoline….
Respondents: [Crosstalk] They built a stone wall, then a pit with a hole. It will not reduce
Respondents: They built a wall high and built a pit and on either side of the stream from the hill, the water comes as a stream down the hill and it comes to the Laya organization built thing. Power comes then. [Reference to a gravity dam].
Interviewer: Okay, so it is like a dram. Okay, unlike the government one. Okay. Does... has anybody explained to you the Laya hydro thing that Laya does and how the government power gets to you?
Respondents: No.
Respondents: No, sir.
Respondents: We don't know how the power gets generated in Laya thing also sir. But after seeing and observing, we don't know much sir.
Interviewer: Okay oh because this is open they can see. But nobody has ever explained. Is that what everybody thinks? Yes, or no?
Respondents: No
[…]
Interviewer: […] So, when Laya comes to talk to you and gives you seeds, do they tell you anything about artificial fertilizers and natural

fertilisers or they just give you the seeds?
Respondents: They tell us to stop using the fertilizers and use the natural manures and protect the seeds which Laya gives us. Because this will help reduce your costs for farming. Millets, corn…
Respondents: Stop using these fertilisers is what they tell.
Interviewer: Yeah. But, when they do come, do they ever explain the link between what is happening, the problems happening in your farm and climate change? Do they, do they tell you anything about climate change?
Respondents: No, sir.
Respondents: No.
Interviewer: It is a yes or no [prompting a hesitant participant].
Respondents: No. They told us about fertilizers
Interviewer: Yes or no.
Respondents: [Crosstalk] But they never told about weather changes. If we follow them, they give seeds that they give are according to the weather also… [Crosstalk]. But, we don't put those seeds
Interviewer: They are not planting them? My question is, do they tell you anything about climate change when they come to talk to you.
Respondents: No.

Against the backdrop of low knowledge levels, alongside broad perception of climate change signs and indicators amidst gaps in ability to associate acknowledged mitigative and adaptive interventions as climate change actions, probing the data to identify perception of cause may indicate critical leverage points for attenuating knowledge gaps, boosting climate agency, action and leadership.

Cause and Proximity

Table 36: The relative prevalence of perceived causes of climate change across study populations in India

Subset	Village	Humans		International		Local		National		Nature		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Laya	Pulusumamidi	0	0%	0	0%	0	0%	0	0%	0	0%	0
	Nallikota	0	0%	0	0%	0	0%	0	0%	0	0%	0
	Munagalapudu	1	25%	1	25%	1	25%	1	25%	0	0%	4
PRAGATI	Agraharam	0	0%	0	0%	0	0%	0	0%	0	0%	0
	Itikalakota	4	40%	1	10%	1	10%	3	30%	1	10%	10
	Palem	4	57%	0	0%	3	0%	0	0%	0	0%	7
	Sunaladana	1	100%	0	0%	0	0%	0	0%	0	0%	1
	Totals	**10**	**45%**	**2**	**9%**	**5**	**23%**	**4**	**18%**	**1**	**5%**	**22**

Overall, five codes (four in Laya and five in PRAGATI Villages) identifying cause and proximity have prevalence in the case (see Table 36). God/Religion is the only inactive code in the overall dataset. The higher prevalence of markers of cause and proximity in the PRAGATI subset is consistent with observation of higher premium climate knowledge and lower knowledge gaps. The general data suggests responsibility for climate change is perceived to be more immediate or locally oriented (national and local/village level responsibility outstrips

international (nine of 22 versus two of 22). In order of rank, Humans (10 of 22), Local (five), National (four), international (two) and nature (one) account for the prevalence of the theme that captures climate change responsibility. A more granular turn shows this holds true for both village subsets, but with variations across localities that are of significance. Whereas the two markers of local attribution of cause (national and local/village) account for twice (50 percent versus 25 percent) the relative prevalence associated with the distal causes (international) for the Laya subset, the proximal factors account for six and half times more than distal ones (39 percent compared to six percent, respectively) in the PRAGATI subset. This significant trend towards explicit attribution of local responsibility suggests the general reference to humans is likely local—an observation strongly supported by the type of human activities identified. The highly localized nature of the attribution of cause in these contexts, conflicts with scientific facts in proximal terms.

While the consensus is that climate change and variability in this dispensation are fundamentally anthropogenic, which is in alignment with the first order ranking of human attribution in the dataset, responsibility is decisively attributed to global industrial forces (other countries, their industries and citizens (humans). Further, as contended at the outset of this chapter, the differentiated nature of cause and responsibility in a complex environment such as India fundamentally shows that sub-national attribution of cause is more accurately reposed outside of this rustic village. Probing the subsets reveals variations that suggest this confounding internalization of blame or responsibility is simultaneously related to the knowledge gaps and the nature, scope and duration of information provision associated with the context-dependent nature of the resource use and management interventions underway in the localities under investigation. This is reinforced by the fact that though nature, a significant secondary cause and the primary

means through which impacts manifest, only marginally features in the PRAGATI subset with relative prevalence of six percent.

PRAGATI Villages

The PRAGATI subset features the overall active codes in the same order with Humans accounting for a half of prevalence (nine of 18); local at more than a fifth (22 percent); national at 17 percent; and international and nature with prevalence of six percent each. The observation that climate change causes are perceived as local is discernibly so in two of three villages in the subset where this measure is accessible (Palem and Itikalakota). However, there are distinctions in the proximity of attribution of cause. In Palem, where only two codes are active—Humans (in general) and Local with comparable levels of prevalence (four of seven and three of seven, respectively), the manifestly proximal attribution of cause accounts for 43 percent of relative prevalence and is maximally internalized at the village level. While Itikalikota, which shows the greatest variation in codes (all five that are active in the dataset), exhibit a similar level of proximal attribution of cause (40 percent) and ranks Humans as its primary single cause (40 percent), shifts the proximity of cause away from the village. Rather than internalizing it, it is reposed at the national level. Specifically, national attribution of cause accounts for three-quarters (three of four) of the relative prevalence for the total for local attribution for the village. It also accounts for the entirety of the prevalence for national causes in the overall data set (three of three), alongside the only instance of international and nature-induced causes with marginal prevalence of one each. In Sunaladana, where only one code registers (and in a single instance by older men), it is accounted for by Humans in general. While this suggests a neutral disposition, the general trend towards local attribution and the nature of the human activities noted strongly suggests localized attribution, as the cohort specifically proffered this human attribution of cause

in association with the need to judiciously use resources in a resource-dependent context where climate impacts are manifest. Consistent with its distinction as the village with the highest knowledge gap in the PRAGATI subset and the limitation of knowledge acquisition sources to informal networks (friends, peers and the grapevine), Agraharam shows no prevalence for any cause.

The strong variation of the attribution of cause and proximity in PRAGATI Villages strongly correlates with gender and age. Older women, who show a higher level of knowledge gap, account for none of the prevalence of cause. Young men, who have a higher overall level of awareness about climate change, account for nearly half of all the prevalence of all specification of causes (eight of 18), but this is almost entirely accounted for by the young men of Palem (seven of eight), who also account for the entirety of cause attribution in their village. This is consistent with the distinction of this group in terms of knowledge level, the tapestry of manifestly credible initial climate knowledge acquisition sources available to and accessed by them, including “deeper explanations” through capacity building efforts led by PRAGATI that focused on crop diversification and resilience, alongside information provision (see excerpt 19). Further, older men and young women account for the same level of prevalence (five of 18 each), which suggests there's a strong correlation with age (youth 13 of 18 versus older folks five of 18). Consistent with their apparently higher levels of climate change knowledge, young men account for more than half of the human attribution of cause (five of nine).

While Young women view the cause of climate change to be distant (accounting for two-thirds of national attribution's prevalence (two of three) and all of nature's (one of one), young men foreground local responsibility, accounting for three-quarters of local attribution of cause's prevalence (three of four). However, in both instances, these age and gendered observations are

entirely accounted for by circumscribed localities (young men in Palem (three of four) for local and young women in Itikalakota (two of three), who benefited from very different levels of direct engagement and deeper learning through the climate intervention underway in their respective villages). This divergence in attribution of cause and the differences in the levels of engagement between the young men of Palem (direct and targeted) and the young women in Itikalakota (non-specific to absent) strongly supports my assertion that the confounding internalization of blame or responsibility is simultaneously related to the nature, scope and duration of information provision associated with the context dependent nature of the resource use and management interventions underway in the localities under investigation. This is underscored by the fact that, in Itikalakota, where close reading of the data only shows limited direct engagement with older women, both cohorts who report markers of cause (young women and older men) interpellated non-localized attributions against the backdrop of observation and news structuring their climate knowledge. As excerpt 34 shows, even amidst knowledge gaps, due to scarcity of time that undermines young women's abilities to access climate information, among other factors, their highly textured and accurate observational and experiential knowledge enables them to apportion cause attribution amidst a wave of complexities.

Excerpt 34: Compelling experiential and observational knowledge enables effective apportioning of cause attribution amidst complex impacts

Young Women Focus Group – Itikalakota, PRAGATI Subset
Interviewer: Have you heard word climate change? Respondents: No. Interviewer: You work on the farm; do you face any problems in farm? Respondents: We face general problems because we are in field for morning; 9am to evening, 4pm. [Cross talk] Respondents: We not getting enough employment like in past. Because of over population. One project [Polavaram Dam] is running here. Because of that some village people are came [sic] here to live. Because of project we are getting floods frequently. Interviewer: Do you have any problem during planting plants on your farm? Respondents: Because of heavy rains, floods are seen because of that we lost our crop. Respondents: Some plants are [do] not required more water; high amount of water damages the yield. Interviewer: What are the plants that require low amount of water? Respondents: Pulses… Black gram, green gram, dal [types of lentils]. Our agriculture mainly depends upon rainfall. Interviewer: Are you getting more rain or less rain? Respondents: We [are] getting very? rainfall, but we [have] heavy rainfall because of cyclones. Interviewer: Are you getting more cyclones comparing with past or not? Respondents: Frequency of cyclones getting high, floods also seen here. We didn't [see] floods like this in our lifetime. Interviewer: Have you faced this type of floods before? Respondents: We face floods but not this much intensity. Because of the project water is stagnated here. Interviewer: What project? Respondents: Polavaram project Interviewer: What you think causing flooding?

Respondents: Because of Polavaram dam water is stagnated in our farms. [Crosstalk]. In polavaram dam they construct walls on farms and stop the flow of water so water is stagnated we get floods.

In the case of older men in Itakalakota, they account for the only instance of international attribution of cause in the dataset and while they still localize the attribution of cause (50 percent - local and national) its equal distribution between local (village) and national suggests, they have a more neutral disposition on the location of cause, but it is proximally more removed from the village.

Laya Villages

This is supported by the data for the Laya subset, where young men in Munagalapudu, for whom news is responsible for half of relative prevalence for their initial climate knowledge acquisition sources, account for all the prevalence for climate change cause in this subset in a manner identical to older men in Itikalakota.

Climate Risk

Table 37: The relative prevalence of climate and vulnerability risk markers perceived across study populations in India

Subset	Village	Children - 2		Coastal/Riverside Dwellers		Equal Risk		Farmer - 2		Hillside Dwellers		Me		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Laya	Pulusumamidi	0	0%	0	0%	5	50%	3	30%	1	10%	1	10%	10
	Nallikota	0	0%	0	0%	3	100%	0	0%	0	0%	0	0%	3
	Munagalapudu	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0
PRAGATI	Agraharam	0	0%	1	25%	2	50%	0	0%	1	25%	0	0%	4
	Itikalakota	0	0%	0	0%	4	100%	0	0%	0	0%	0	0%	4
	Palem	0	0%	0	0%	9	75%	3	25%	0	0%	0	0%	12
	Sunaladana	0	0%	1	20%	4	80%	0	0%	0	0%	0	0%	5
	Totals	**1**	**3%**	**1**	**3%**	**27**	**71%**	**6**	**16%**	**2**	**5%**	**1**	**3%**	**38**

The propensity for localization of cause attribution, which is contrary to scientific reality and consistent with the high levels of knowledge gaps observed in the data, is consequential. It "means a variety of factors other than scientific knowledge of causes and solutions are being used to form climate change attitudes, preferences and behaviours" (Maibach, Roser-Renouf, Leiserowitz, 2008, p. 495), which accords heightened importance to identifying what factual aspects of knowledge is most important for aiding people to discern and manage current and

projected risks, optimize agency and action. This is key, as palpable resource limitations mean the faulty internalization of responsibility for anthropogenic climate change in these villages is likely to undermine climate agency, motive and leadership, not least where the faulty internalization is predicated on a falsehood such as “open defecation” (see excerpt 36). So, probing climate risk perception in these environments of high internalization of risk is likely to further illuminate the operationalization of this proximal cause perception and clarify leverage points that can aid in capability enhancement (climate agency, action and leadership) through the provision of climate information, activity design and implementation.

Overall, Table 37 shows six analytical units that denote climate risk are grounded in the dataset for the Indian case (Equal Risk - 70 percent, Farmers-2 - 16 percent, Hillside Dwellers five percent and Me, Coastal/Riverside Dwellers and Children, with prevalence of seven percent each). However, they are varyingly associated with the datasets. Consistent with the higher levels of climate knowledge in the subset, five are grounded among PRAGATI Villages which accounts for all the prevalence for Children-2 and Coastal/Riverside Dwellers, whereas four climate risk groups are grounded in the Laya Villages, which accounts for all the prevalence for self-specification (Me). This means the top three perceptual markers of primary climate risk in both villages are consistent with the overall data and in the same order.

While equal risk is the most grounded perception of climate risk in both villages, it is significantly higher in PRAGATI Villages where it exceeds three-quarters (19 of 25) of the relative prevalence for climate risk in the data for the subset compared to 61.54 percent or eight of 13 in Laya Villages. Laya Villages show a significantly higher propensity towards risk specificity (46 percent versus 24 percent) and account for the only instance of personalized expression of disproportionate climate risk (Me, with a prevalence of three percent overall and

eight percent in the Laya dataset). The latter prefigures evidence of a more inward looking/communal disposition among PRAGATI Villages, specifically the fact that the population across PRAGATI Villages specify twice as many groups as being at disproportionate risk to climate impacts (four: Children-2, Coastal/Riverside Dwellers, Farmers-2 and Hillside Dwellers) than Laya Villages (two: Farmers-2 and Hillside Dwellers). Comparatively lower knowledge gaps may also account for this difference, but scrutiny of the subset and village level data shows that context is a significant factor in declarations of primary risk perception.

PRAGATI Villages

While equal risk is the most grounded perception of climate risk across all PRAGATI Villages, no single village in the subset reflect the same order or degree of risk perception. This collective risk disposition conflicts with findings by Bord et al. (1998) and McDaniels, Axelrod and Slovic (1996) that individuals distance themselves from climate risk such that the threat is perceived to be greater for others than themselves. In Itikalakota, equal risk accounts for all the prevalence for climate risk, while it accounts for 80 percent (four of five) in Sunaladana, three-quarters in Palem and a modest 50 percent in Agraharam, the village with the most varied climate risk perception categories (three: coastal/riverside dwellers (one); equal risk (two) and hillside dwellers (one). The fact that three of the four group-specific identification of climate change vulnerability feature in circumscribed localities (Children-2 in Sunaladana, Coastal Riverside/Dwellers in Agraharam, Farmer-2 in Palem and Hillside Dwellers in Agraharam) underscores the importance of context in structuring climate change perceptions. Agraharam, which accounts for the only instances of coastal/riverside dwellers and hillside dwellers in the subset, is subject to flooding due to its location by the Godavari River. This proximity to the river exacerbates risk for the specified groups in different ways: on one hand, the construction of

the Polavaram Dam along the course of the Godavari inundates some fields and coastal homes, which renders those in proximity more vulnerable (see excerpt 29); whereas a hillside dweller's distance from the water renders their rainfed agricultural activities and land less productive in increasingly long periods of drought (see excerpt 35).

While there is no overall gendered disparity in climate change risk perception, it is important to note that older men in Palem account for all the prevalence for farmers as a particularly vulnerable group. This is likely attributable to the intractable nature of their agricultural challenges given this cohort disproportionately accounts for observation as a climate knowledge acquisition mode among PRAGATI Villages (two-thirds) and crop yield/soil health and weather account for the totality of signs they perceive. Similarly, their women, (particularly older women (five of nine), account for a higher level of the prevalence for equal risk (eight of nine) in the village and for PRAGATI Villages overall (eight of 19). While the data suggests this is particularly circumstantial rather than evidence of a more communal feminine disposition or ethic of care, it correlates with the fact that the only instance of children being specified as the most vulnerable group emerged from the older women cohort in Sunaladana. It is important to note that the young men cohort from Palem, which benefited from capability enhancement in a focused manner through the intervention and exhibit lower levels of knowledge gaps, account for no prevalence for climate risk. This is significant as higher levels of climate knowledge ostensibly correlate with recognition of signs and risk identification/specification. The implication here is that the nature and scope of the context dependent climate information provision mechanism through this resource use and management interventions is limited.

Laya Villages

The contextual nature of climate risk perception is supported by the dataset for the Laya

subset. The village of Pulusumamidi accounts for the entirety of the variation in climate change risk perception in Laya Villages. As such, the observations made about the propensity of Laya Villages to specify risk are entirely attributable to this village. However, equal risk is still the dominant perceptual marker in this context, accounting for half of the prevalence for climate risk in the data for the village. The specification of farmers as a disproportionate risk category accounts for a third of relative prevalence, which is consistent with crop yield/soil health and weather accounting for the totality of the signs and indicators of climate change they perceive (seven of seven) and the narrower but maximal agricultural nature of the range of climate actions identified by this village (multi-cropping, planting trees and soil enhancement). This suggests a particularly acute agricultural challenge in the locality. The specification of hillside dwellers and the only instance of personalized declaration of exceptional risk each account for a tenth, both of which are associated with location/contextual disadvantages. Nallikota and Munagalapudu only show prevalence for equal risk. Overall, there's no significant gendered and age correlation in perceptions of climate change risk, which conflicts with palpable evidence of a gender gap in environmental risk concern dating back to Kay and Gitlin's (1949, cited in Davidson and Freudenburg, 1996) finding that women "express higher levels of concern about potential environmental and technological risks than do men" (p. 302), particularly when issues have local manifestations (Brody, 1984; Mohai, 1992). However, the lack of differentiation in these collectivist and traditional contexts (in terms of parental status, employment) and disassociation with knowledge are likely accountable for the divergence between my observation and those drawn from almost entirely Western contexts.

Evidence of a decisively communal risk disposition and intractable levels of internalization of cause underscores these factors as highly important leverage points for

improving agency, action and leadership. It strongly reinforces the contention that it is "not possible to make progress on defining dangerous climate change, or in developing sustainable responses to this global problem, without recognizing the central role played by social or individual perceptions of danger" (Dessai et al., 2004, p. 11). Given the import of observation for knowledge development, the highly proximal and discernibly existential manifestation of impacts in these contexts, it strongly suggests that privileging the internal risk disposition/perspective rather than external and scientific perspectives is more important and likely more enabling.

However, this communal disposition must be approached carefully as the internalization of risk is associated with specified actions (including faulty acts such as defecation, see excerpt 36), which, if associated with distinct groups, can further undermine communal harmony in a low information context where traditional structures are fissuring (see excerpt 31). It is also likely to negatively impact climate agency, which is highly constrained by informational and other capability deficits. These observations are of theoretical import. First, this distinctly socio-cultural elicitation and analysis of risk effectively demarcates a non-psychometric approach that paves the way for understanding climate actions and intentions rather than a discursive and highly conceptual exercise of rating risks, as is common in discrete psychometric studies, namely Kempton (1991) and Lofstedt (1991), examining dimensions of climate change and individual perceptions.

Secondly, the observation of a primary socio-cultural risk perspective/disposition that offers a critical leverage point for enabling effective action and structuring knowledge improvement mechanisms attenuates a crucial gap in climate risk communication about the communication needs of marginalized communities (Agyeman, Doppelt, Lynn & Hatic, 2007;

Vaughn, 1995). Third, the strong collective motive and collective risk disposition suggests societal threat (a transcendental disposition) rather than individual perception of threat or loss is more operative in these contexts, an observation consonant with sociotropic motives in the political science literature rather than risk communication's assertion of personal threat's primacy in motivating behaviour (Maibach, Roser-Renouf & Leiserowitz, 2008). However, it also definitively shows that delving into the socio-cultural to ascertain resonant frames associated with risk disposition is insufficient for enabling effective climate action when knowledge gaps inaccurately structure cause internally.

Considering the necessity of substantial agency for effective mobilization of populations and the success of climate change interventions (Adger et al., 2008), closer scrutiny of the nature of climate change agency in these contexts is paramount, as it offers specific points of action for enhancement and/or clarification through message framing, project (re)design and implementation.

Excerpt 35: Socio-cultural changes benefits youth and undermines the traditional and communal order associated with seniority and respect.

Older Women Focus Group – Agraharam, PRAGATI Subset
Interviewer: You talk about the rainfall; is there we can do anything about this? Respondents: Rainfalls (sic) are slow, Interviewer: Is there anybody most affected by rainfall? Respondents: People who are far away from water bodies they affect most. Interviewer: Who leads you guys to teach about climate change? Respondents: Who interested, preferably youth. [Cross talk]. If we lead, youth will not listen to us Interviewer: Why youth not listen to you? Responders: Because of age factor they will listen to us, they think that, they are knowledgeable then us, and always drunk they were in state Even not listen us what we saying to them.

Excerpt 36: Knowledge gaps undermine positive knowledge seeking disposition and accurate multilevel specification of cause and actions

Young Men Focus Group - Mungalapudi, Laya Subset
Interviewer: Do you want to learn more about climate change? Respondent: Yes Interviewer: Who should lead you? Respondents: Ourselves [pointing at members of the group]. Interviewer: Why should you guys lead? Respondents: We are here for longer periods, so we can lead. Interviewer: Have you ever heard of 1.5 to Stay Alive? Respondents: No. Interviewer: Have you heard the term COP – Conference of the Parties? Respondents: No. Interviewer: Do you think we can do something for climate change? Respondents Yes! Interviewer: What do you need to do about climate change? Respondents: Stop pollution, ban the plastic and stop open defecation.

Climate Change Agency

Table 38: The relative prevalence of forms of climate change agency across study populations in India

Subset	Village	Fatalism		Mixed - Agency		Nature 2 - Agency		Optimism		Resource Gaps		Density
		Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	
Laya	Pulusumamidi	4	16%	5	20%	1	4%	7	28%	11	44%	25
	Nallikota	2	22%	0	0%	1	11%	4	44%	3	33%	9
	Munagalapudu	4	27%	4	27%	2	13%	2	13%	8	53%	15
PRAGATI	Agraharam	10	45%	1	5%	6	27%	4	18%	13	59%	22
	Itikalakota	6	40%	3	20%	4	27%	0	0%	7	47%	15
	Palem	10	45%	1	5%	6	27%	4	18%	13	59%	22
	Sunaladana	9	33%	3	11%	3	11%	7	26%	14	52%	27
	Totals	**47**	**32%**	**14**	**10%**	**17**	**12%**	**27**	**19%**	**76**	**52%**	**145**

The data expressed in Table 38 shows low and highly constrained levels of agency across the study populations. In terms of overt articulations of agency, explicit fatalism accounts for a significantly greater share of prevalence for markers of agency – approximately a third (32 percent) compared to less than a fifth for Optimism (19 percent). This distinction is heightened by evidence of highly constrained agency. Specifically, resource gaps, which are largely associated with fatalism and mixed agency, constitute the most grounded analytical markers of climate change agency in both sets of villages. Resource gaps, which accounts for over half of the prevalence of all markers of climate agency (76 of 145) in these villages, is entirely associated with a lack of climate change knowledge. In most instances some respondents have never heard the term climate change and acute levels of incapacitation on crucial measures of subsistence.

Nonetheless, these incapacitations are indicative of constrained agency as they are all expressed alongside a strong desire to learn more about the phenomenon, the range of ways it does and will impact their lives and how they might respond (see excerpt 19). The implication here is that though resource gaps are associated with fatalism, it does not always lead to fatalism: it stirs curiosity, as is evident from the calls to learn more and mixed agency (approximately a

tenth of relative prevalence overall), which figures at identical levels in both sets of villages (10 percent for PRAGATI Villages and nine percent for Laya). Beyond an association with knowledge gaps, the non-identification of the term climate change is also consistent with assertions by the Brazilian indigenous leader Jorge Terena, (cited in Davis and Ebbe, 1995) that Western conservation language (sustainable development, traditional knowledge etc.) is not readily recognized in indigenous and traditional communities, but as I have established through dialogue, the meanings and implications of these constructs are discernible and accorded with profound opinion intensity.

Nature, which is also associated with fatalism, is the only other statistically significant indicator of climate change agency in the Indian case with prevalence of 12 percent. The curiosity that marks constrained climate agency in these contexts contrast with Lorenzoni, Nicholson-Cole and Whitmarsh's (2007) assertion that individual barriers to communicating climate change is necessarily associated with the trifecta of a lack of knowledge, lack of desire to find out information and a lack of locally and personally relevant and accessible information. The data convincingly points to the likelihood that in contexts where subsistence and the traditional and communal order are directly and perceptibly threatened by climate impacts, a lack of knowledge is readily declared and associated with an overwhelming knowledge seeking disposition in all but one instance. In fact, perceptibility of signs and climate risk appear to so profoundly structure and spur an impetus to act that, akin to the Fijian case, it overrides or precludes climate denialism (undetected), which is conventionally held to be a product of knowledge gaps.

Although both sets of villages are more fatalistic than optimistic, fatalism is significantly higher in PRAGATI Villages (36 percent) than Laya Villages (26 percent). This is significant

because while Laya Villages are exposed to more explicit climate change information due to programme design, PRAGATI Villages show lower overall knowledge gaps and higher premium climate knowledge, which one would expect to accord greater or equal levels of agency, where access to resources to mobilize agency is equal or comparable. The data suggests that it is the strong association of climate change impacts with nature and its perceived impermeability that accounts for the higher level of fatalism in PRAGATI Villages, which have experienced less explicit ideation. So significant is this factor that PRAGATI Villages account for more than three-quarters of the prevalence of Nature as a form of fatalism. The substantial prevalence associated with nature, as an explanatory factor for fatalism, particularly in PRAGATI Villages, alongside the largely knowledge related resource gaps and high curiosity to learn and do more about climate change in these contexts strongly indicates the mutability of the social and cognitive barriers to climate action in these contexts. The high likelihood that tailored information and technical support can address the expressed nature-oriented fatalism observed in these contexts decisively underscores this contention (see excerpt 37).

Variations in the factors undermining climate agency across villages warrant probing of the village subsets that is useful for optimizing agency and enabling effective actions, which is addressed in the subsequent section. But, it is noteworthy that religion does not register as an explicit or implied factor associated with agency across these study populations, whose lives are structured around and by religious ritualism, veneration of deities, vibrant and pious pandugas (festivals), sacred narratives and funerary practices. However, there is strong socio-cultural evidence that at a performative level, pandugas such as Vittanala Panduga (seed festival) and other religious practices can be used to boost agency in these contexts.

The Adivasis observe a wide array of these performative religious activities throughout

the year, many of which are "related to various stages of agricultural operations: land preparation, sowing, harvesting consumption as well as well-being of crops, fertility of soil, timely rainfall and forest related activities" (Laya, 2005, p. 35). The scale of direct relationship between agronomic activities and pandugas is illustrated by Appendix N.1 to N.5. The festivals have close bearing with the sustainability of livelihoods in two seemingly conflicting ways that are consonant with the dialectics of freedom and control (Papa, Singhal, & Papa, 2006). It drives consumption, such that a family spends more than 4,500 Rupees (approximately US$60)—often through loans that perpetuate insecurities—in preparation for these festivities in a country where more than one-fifth of the population subsists on less in a month (World Bank, 2018). However, it also drives production, as sowing/harvesting and marketing are also greatly influenced.

The community has demonstrated its capacity to manage its resources through the preservation of seed varieties, improving soil fertility, water management, etc. to meet these socio-cultural needs. However, they have been less successful in doing so to meet routine needs amidst climate variability and change that constrains resource productivity patterns. Adapting these rituals could aid in addressing routine needs and broader capability enhancement that boosts community level climate resilience in these low capacity contexts. This observation supports Titilola's (1994) contention that sustainability, particularly amidst unprecedented geologic change that compounds vulnerabilities, is best achieved by according the socio-cultural equal, if not greater, importance to physical and biological constraints.

More broadly, leveraging the direct and operative relationship between agronomic activities and pandugas noted above to boost capabilities amidst climate change and variability in these indigenous tribal communities foregrounds one of indigenous knowledge systems' distinct advantages relative to Western knowledge: as a holistic and transdisciplinary system, it unifies

the religious, spiritual and livelihoods, unlike Western science, which even demarcates firm boundaries across aspects of livelihoods (agriculture, forestry, natural resource management, human health, among others) (Duhaylungsod, 1994; Reichel, 1994). This also reinforces the profound limitations of managing environmental and climatic risk from a purely positivist standpoint in an era of post-normal science and impact that were established in the review of climate risk disposition.

PRAGATI Villages

Explicit fatalism is dominant relative to explicit optimism in all PRAGATI Villages, ranging from 45.45 percent in Agraharam and 40 percent in Itikalakota to 33 percent in Sunaladana and 29 percent in Palem. While Agraharam's first order rank correlates strongly with the relatively higher levels of knowledge gaps in this village, Itikalakota's second order rank with comparable levels of fatalism contradicts its first order rank for premium climate knowledge relative to all other villages in this subset. Palem's rank as the least fatalistic also does not comport with its secondary status relative to Itikalakota in terms of lower levels of knowledge gaps relative to other markers of knowledge. However, the comparable levels of fatalism in both villages suggest that the expected correlation between knowledge and agency is not discounted by this observation and that the contextual nature of climate change impact and variation in the nature and scope of response mechanisms may account for differences in the levels of fatalism observed across localities. This contextual observation is underscored along other dimensions based on discrete variations in the nature of agency.

Palem, the PRAGATI Village with the lowest level of explicit fatalism is also the only village that shows no prevalence for nature as an associated factor, whereas Agraharam, which accounts for the highest level of fatalism records the highest level of nature-associated

explanatory factors (Agraham and Itikalakota at 27 percent each and 11 percent in Sunaladana). Itikalikota is the only village where explicitly positive climate change agency is absent but mixed-agency accounts for 20 percent of the level of agency captured in the data (significantly higher than the other villages: 13 percent in Palem, 11 percent in Sunaladana and five percent in Agraharam). Explicit positive climate change agency is highest in Sunaladana at 26 percent, 18 percent in Agraharam and 11 percent in Palem. These two observations indicate that perception of cause, another contextually influenced measure of climate perception with implications for agency, structures climate agency in varying ways. Palem and Sunaladana, which positions the cause of climate change to be more highly proximal (localized), show lower levels of explicit fatalism than Itikalakota, which singularly accounts for distal factors (international and nature) in the subset. Agraharam accounted for no prevalence related to cause and proximity, which suggests its fatalism is decidedly attributable to resource gaps, the informational and technical elements of which can be addressed to attenuate nature attributional constraints on agency to some degree.

Excerpt 37: Nature-Oriented Fatalism Induced and Constrained by Knowledge and Broader Resource Gaps

Young Men Focus Group - Itikalakota, PRAGATI Subset
Interviewer: What do you think is causing climate change? Do you think we can do something about this? Respondent 1: We can't do anything. Water is coming from upstream so if we create artificial ponds it will help during flooding and it helps in summer to get water. Respondent 1& 2: No. Respondent 4: We can't do anything, water is coming from upstream so if we create artificial ponds it will helps during flooding and it helps in summer to get water. Respondent 5: No Interviewer: Why can't you do? (Only for Respondents-2, 3,5) Respondent 2, 3, 5: We don't aware of that. Interviewer: Do you want to learn more about climate change? Respondents: Yes, we are ready to learn.

Laya Villages

While explicit fatalism doubles explicit optimism (36 percent compared to 15 percent) in the PRAGATI subset, they are more evenly matched in the Laya subset (26.42 percent compared to 24.53 percent, respectively). This correlates with the lower prevalence of nature as an explanatory factor for fatalism (7.55 percent or four of 53 vs 14.13 percent or 13 of 92). Since

knowledge-related resource gaps and mixed agency are identical in both sets of villages (9.43 percent in Laya villages and 9.78 percent in PRAGATI Villages), the data is supportive of my assertion that nature associations with climate change impact is more likely to predispose people towards fatalism than a general lack of knowledge. A more granular look at the data for the subset is also supportive of the veracity of my assertion that this may be attenuated by information provision and resources.

While the overall data for Laya Villages reveal that explicit fatalism is marginally more prevalent, Munagalapudu is the only village in the subset where explicit fatalism outpaces explicit optimism (fatalism 27 percent or four of 15 vs optimism 13.33 percent or two of 15). This conforms with the observation that the village has the highest knowledge gaps in the subset, accounts for half of the prevalence of nature's prevalence in the Laya data subset (two of four) and a quarter of the prevalence of markers of climate change agency for the village (two of eight). But, it is also the only village in the subset where an information seeking resource disposition dominates the articulation of climate agency (resource gaps 53 percent), which is exemplified by excerpt 38.

Considering the substantial level of constrained optimism observed in both sets of villages, alongside a compelling knowledge seeking disposition and curiosity despite informational and broader resource gaps, it is credible to conclude that the motive to act is substantial and like the dominant collective risk perception, climate motives are largely independent of climate knowledge in accordance with findings by Leiserowitz (2003). Understanding the nature of this resilient motive to act on climate change amidst both capability and resource gaps will clarify another critical climate perception marker that can be used to (re)frame messaging and (re)formulate climate action, boost agency and action.

Excerpt 38: Climate agency constrained by informational gaps, insufficient technical support, limited and inefficient alternatives

Older Men Focus Group - Munagalapudu, Laya Subset
Respondents: The yield is getting lesser, sir. The investment is increasing Respondents: One thing sir, we are using these artificial fertilizers, sir. What is happening is that many diseases are also coming. We can't change anything, sir. We have to change ourselves by putting natural manures. It will be good as we are used to this artificial fertilizers and pesticides. Plants are getting diseases. Interviewer: Yeah. Okay. So, you are having problems with your crop yield and the soil health. Is there any other problem you are having on the farm? Respondents: What else will we know, sir? That is the issue that we are facing on the farm. If we use the natural manures and pesticides it will be useful. Soil has no potency, sir. We are spraying the fertilizers as the plants are taking away the nutrients, the plants are getting new diseases and we are spraying new pesticides. It is only there for a while and the fertilizers are only useful for only a crop. Interviewer: So, why is that you keep using the artificial ones? Respondents: We are using the things we have; but the fertilizers from outside are looking better, so we are bringing them. [Laughs]. If we don't get anything, we are bringing them from outside. Respondent: People in the village are not willing to work hard here. If we do that it will be better like before. The crops will also be like before. We will also be like before. Translator: Why are you people using the artificial fertilizers then? Respondent: In those days (Not audible) if we bring these fertilizers it will be good... [inaudible]. Millets, corn, sweet potato we used to crop without putting fertilizers we used to crop during our days. We used to crop paddy also without any fertilizers, grow and eat them. Now for everything they use fertilizers, for egg plant, tomato, inaudible. That is why these problems and also knee joint pains. Interviewer: So, the health effects. So, why do you keep using… The question is why do you keep using? Respondents: Laughs why as in… [laughs] Interviewer: Wait, I want to hear from you. Like, why do you keep using the [artificial] fertilizers? Respondents: We feel that if we do not put those fertilizers the crops are not growing. Now it has changed, the climate has changed. We used to eat well. Now these guys cannot eat like what we used to eat and work. So, these guys are using fertilizers as they don't want to work like us. Respondents: [Crosstalk] Interviewer: Oh, the mechanization. So you think the problems you have on the farm is because of the fertilizers? That's what you think is the main cause for it? Respondents: Because of the fertilizers it is getting reduced. The soil has no nutrients. The people are losing their strength. Interviewer: Okay. Alright, do you think that is a problem you can fix? Respondents: How can we, sir? Respondent: No, sir. Instead of spraying pesticides on one part which is affected by the insects, they are spraying on all the field. [Laughs]. So the plants are dying. [Crosstalk] Interviewer: Okay, so who is giving you the artificial fertilizers? Where do you get them? Respondents: We buy them, sir. Interviewer: The buy? This is why…. (Someone enters probably) sorry. Hmmm, so yeah, so when Laya comes to talk to you and gives you seeds do they tell you anything about artificial fertilizers and natural fertilizers or they just give you the seeds? Respondents: They tell us to stop using the fertilizers and use the natural manures and protect the seeds which Laya gives us. Because this will help reduce your costs for farming. Millets, corn… Stop using these fertilizers is what they tell. Interviewer: Yeah. But, when do they come do they ever explain the link between what is happening, the problems happening in your farm and climate change, do they do they tell you anything about climate change? Respondents: No, sir. No.

Motive for Action

Table 39: The relative prevalence of Intrinsic and extrinsic factors that motives climate action across study populations in India

Subset	**Village**	**Children**		**Community/ Village**		**Self/Offspring's**		**Density**
		Prev	**Rate**	**Prev**	**Rate**	**Prev**	**Rate**	
Laya	Pulusumamidi	0	0%	2	100%	0	0%	2
	Nallikota	0	0%	2	100%	0	0%	2
	Munagalapudu	0	0%	1	50%	1	50%	2
PRAGATI	Agraharam	1	20%	4	80%	0	0%	5
	Itikalakota	0	0%	3	100%	0	0%	3
	Palem	0	0%	0	0%	0	0%	0
	Sunaladana	0	0%	2	100%	0	0%	2
	Totals	**1**	**6%**	**14**	**88%**	**1**	**6%**	**16**

Per Table 39, three codes indicative of motive for action on climate change are grounded in the overall data (Community/Village (14 of 16) and children and self/offspring (one of 16

each). Community/Village, which is the most grounded unit associated with the motive for acting on climate change is also the most grounded factor in each set of villages (90 percent for PRAGATI Villages and 83 percent for Laya Villages). The other two factors that register statistically occur in singular instances in different villages (children - one of 10 in the PRAGATI subset and Self/Offspring one of six in the Laya subset), which means each subset only registers two of the three active codes in the overall dataset. Considering the expansive nature of the reference to children, this means the communal indicator accounts for the totality of motive in the PRAGATI subset. This maximally communal orientation is consistent with the higher relative prevalence for equal risk perception in PRAGATI subset. This overall communal motive further underscores my observation that without due care, addressing the knowledge deficit accrued internalization of risk could undermine communal harmony, if the specified actions are linked to particular groups and areas in these generally small and cohesive contexts. This is especially problematic where the internalized specification of cause is faulty and people specific, such as open defecation (see excerpt 36). Motive's largely independent functioning relative to climate knowledge also reinforce the added need for due care in leveraging these areas to boost agency and effective climate action. At a broader level, the data shows a degree of village and cohort-level specificity in the articulation of motive to act on climate change that strongly correlates with knowledge levels, which suggests that motive is largely, but not entirely independent of knowledge as Leiserowitz (2003) established. Probing the village subsets lays this bare.

PRAGATI Villages

Community/Village accounts for 90 percent of the prevalence for motive for action in the PRAGATI subset. It is the only factor accounting for prevalence in Sunaladana (two of two) and

Itikalakota (three of three). It accounts for 80 percent of prevalence in Agraharam where Children, the only other code with any prevalence in the subset is active (one in 10). Interestingly, there is no discernible prevalence for motive for action in Palem, but the decisiveness of the disposition across the subsets and the village's high perception of risk as being equal means it is credible to conclude they also hold a communal motive. It also suggests there is no correlation between knowledge levels and expression of motive as Palem, particularly its young men who have been afforded specific attention, have relatively high knowledge levels and the second lowest knowledge gap in the subset. Furthermore, the village with the highest level of relative knowledge gaps, Agraharam, articulates a wider range of motives (community/village and children). This divergence between climate knowledge and ability to express motive comports with the general knowledge-seeking disposition that underpins articulations of resource gaps that constrains agency. The implication is that the willingness to act on climate change (motive) is independent of knowledge, but its mobilization (agency) is constrained by resource gaps, specifically informational and technical capabilities (see excerpt 38).

The overall communal disposition of this subset is consistent with the emerging trend of a more communal turn in PRAGATI Villages overall, which also strongly correlates with their overall tendency to look more inwardly for climate change leadership (as detailed in the subsequent section, also see excerpt 39) notwithstanding high levels of knowledge gaps. However, explicit motive for action is only evident from circumscribed populations even at the village level and singular age and gender populations in circumscribed localities account for the totality of prevalence for their peers as a whole in the overall dataset. Specifically, young women from Agraharam, who account for 44 percent of the prevalence for community/village for the

entire subset and 80 percent of the prevalence for motive for action for the village overall, are the only young women who account for any prevalence in the overall dataset. Older women and older men from Sunaladana, who equally account for the totality of prevalence for motive of action in their village (one of two each for Community/village), are the only older men and women who account for any prevalence in the overall dataset.

Young men, who account for a third of the prevalence for community/village overall (entirely from Itikalakota), are the only cohort to account for prevalence in more than one circumscribed locality because young men from Agraharam account for the single instance of prevalence for Children as a motive for action in the overall dataset. This means there's a clear correlation between youth in the circumscribed localities noted and the ability to express motive for acting on climate change (young men and women - eight of 10) versus older men and women - two). While there is no age or gendered correlation between premium climate knowledge and age and gender, these observations reinforce my contention that articulation of motive is not dependent on knowledge levels, as men and women articulate motive at the same rate (50 percent each in terms of prevalence) despite evidence of a clear gendered imbalance in knowledge gaps that favour men, especially older men.

Excerpt 39: Knowledge gaps constrains climate agency even among the relatively knowledgeable who are designated leaders, demonstrate positive knowledge mobilization, risk specification and a communal motive

Young Men Focus Group - Agraharam, PRAGATI Subset
Interviewer: How is climate change affecting the village? You started telling rain is any other way affecting village? Responders: No more changes except level of water. [Cross talk] When Godavari overflowed we lost all our houses and furniture. Interviewer: Is there any other way other than overflow of river affecting the village by climate change? Respondents: During floods transportation is problem, we can't get food from outside. Interviewer: Is there anything happening on farm? Did you face any problems? Respondents: It depends up on soil fertility, if soil fertility is less that farm can be use for one time only. Flowering will stop and destroy. Unripe fruits fall down, pest infections Interviewer: Do you think, can you do anything about this problem? Respondents: We are trying stop by spraying different pesticides. Interviewer: Is there anybody most affected by this? Respondents: Flooding takes place low-lying areas, flood not takes place in sandy farms of village. Interviewer: Do you have own farms? Respondents: Yes, I have own farm. Interviewer: Is that your farm nearer to river or not? Respondent: Yes, my farm is nearer to river. Interviewer: Do you think you're most affected? Respondent: Yes. Interviewer: Do you think we can do anything about climate change? Respondents: Even if we want to do, we can't do anything, because changes take place in weather. We can't do anything.

Interviewer: Would you like to learn more about climate change?
Respondent 1: Yes, we want to know but we don't have anybody to teach us.
Interviewer: Why do you want to learn more?
Respondents 1, 2, 4, & 5: If we learn we will benefit.
Respondent 3: For agriculture.
Respondent 6: To learn about pests and pest infections.
Interviewer: Who should lead you to learn more about climate change?
Respondents: Elders ask us to learn and do
Interviewer: The elders asked young women or men?
Respondents: Both men and woman.
Interviewer: Why elders telling you to learn?
Respondents: Our life period is short compare with you. If you learn you can teach to next generation.
Interviewer: Do you feel ready learn?
Respondents: Yes.

Laya Villages

The data from the Laya subset supports these observations at both village and cohort levels. As established, the explicit communal motive accounts for 83 percent of prevalence for motive for action in this subset. In fact, it accounts for the totality of prevalence for motive in all villages, except Munagalapudu which has the highest knowledge gap in the subset. Self/offspring, which is a personalized articulation of motive, is the only other code active in the dataset and registers in a single instance that accounts for half of overall prevalence for motive of action in the village (one of two each). However, this personalization of motive is associated with a collective generational purview of risk and where climate leadership ought to be reposed, specifically the fact that by virtue of being young, the respondent and his peers will be directly subjected to the projected climate impacts in their village (See excerpt 36).

Akin to the observations in the PRAGATI subset, explicit motive for action is only evident for circumscribed populations even at the village level and singular age and gender populations in some circumscribed localities account for the totality of prevalence for their peers in the overall dataset. Specifically, young men in Munagalapudu, who account for the totality of prevalence for motive for action in their village (as described above) are the only set of young men in this subset to register prevalence overall. Similarly, older men in Polusumadi, who account for a half of the prevalence for motive for action in their village alongside older women

(one of two each), are the only set of older men in the overall Laya subset to show prevalence for the theme. Older women from Nallikota, who account for the totality of prevalence in their village (two of two) and their peers in Pulusumadi (one) account for the totality of prevalence for motive for action associated with older women (three of three). This means there is a clear correlation between older women in these circumscribed localities and the ability to express motive for acting on climate change. Specifically, older women from these two villages account for a half of the prevalence for motive for action in the Laya dataset, matching the overall prevalence attributable to men overall (older men - one of six and younger men - two of six). While no clear overall gendered conclusion can be drawn, it is significant as young women registered no prevalence on this measure.

Except for older men from Pulusumamidi, no cohort's relative distinction for articulating motive comports with high knowledge levels. In fact, the data for the overall subset, as detailed earlier, show women overall as having higher levels of knowledge gaps, with no notable exception for older women in Nallikota and Pullusumadi. Even more compelling, young men, the sole cohort in this subset for whom premium climate knowledge (a posteriori) accounts for a clear majority of their climate knowledge markers, articulated no clear motive.

This substantial support for the general independence of motive from climate knowledge, alongside compelling levels of a common motive (communal) amidst high levels of fatalism but even higher levels of constrained agency, is indicative of the mutability of some consequential socio-cultural limits to climate action in low capacity contexts. This is supported by the fact that the ostensibly dominant marker of agency in terms of relative prevalence (resource gaps or constrained agency) can be tapped through capability enhancement informationally and technically, even where it is underpinned by the seemingly impermeable (nature-oriented

fatalism). As contended earlier, the latter is mutable because it is articulated with information deficits rather than the fixity that underpins a biospheric or transcendental disposition. These are significant insights for optimizing climate agency and mobilization for efficacious action to the extent that there is more clarity about the core mitigating factors (resource gaps of both an informational and technical nature), perceptual valence(s) and motive (both of which are communal). Theoretically, these insights specify social limits to climate adaptation, their levels of mutability and pathways for leveraging them, which builds upon conceptual propositions of socio-cultural limits (Adger et al., 2008; Moser, 2010). Accordingly, the next section probes the data to identify the study population's disposition towards climate leadership.

Leadership

Table 40: The relative prevalence of preferred sources of climate leadership across study populations in India

Subset	Village	Community/ Village		Elders		Exemplary Females		Exemplary Men		Exemplary Person		External		Youth		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Laya	Pulusumamidi	2	10%	0	0%	0	0	0	0%		0%	16	76%	3	14%	21
	Nallikota	2	40%	0	0%	0	0	0	0%	1	20%	1	20%	1	20%	5
	Munagalapudu	1	10%	0	0%	0	0	0	0%	2	20%	4	40%	3	30%	10
PRAGATI	Agraharam	4	27%	4	27%	0	0	0	0%	5	33%	0	0%	2	13%	15
	Itikalakota	3	38%	0	0%	0	0	0	0%	3	38%	0	0%	2	25%	8
	Palem	0	0%	0	0%	1	0.063	2	13%	9	56%	0	0%	4	25%	16
	Sunaladana	2	20%	0	0%	1	0.1	0	0%	7	70%	0	0%	0	0%	10
	Totals	14	16%	4	5%	2	0.024	2	2%	27	32%	21	25%	15	18%	85

Seven markers of climate change leadership are evident in the overall dataset (see Table 40). The markers are community/village, elders, exemplary females, exemplary men, exemplary person, external, and youth. Traditional structures, family and self, show no prevalence in the dataset. The ideational deficit, which is also evident from the high knowledge related resource gap in the study population functions as an explanatory factor for the absence of self and family as climate change leaders. The absence of traditional structures as a focal point for climate change leadership is due to the fact that there is no formal communal or village level

organizational structure, family or individual in whom customary authority is reposed. So unlike Fiji, where there is a chief or in Belizean Mayan communities where there is an Alcalde, whose roles are both customarily and legally regarded, traditional and indigenous structures are more diffused. This is a significant contributory factor for community/village only featuring as the fourth most grounded source to which the villages look for climate change leadership (16 percent). However, the intractable resource gaps appear to be a more significant factor given the high communal disposition in terms of risk perception and motive (see excerpt 40).

Excerpt 40: Resource gaps and the scale of challenges undermines confidence in the traditional and communal order for climate leadership.

Older Women Focus Group - Pulusumamidi, Laya Subset
Interviewer: Oh, you don't know if they will listen or not. Oh okay okay. (Crosstalk) Respondent 2: But previously they gave us plants and did other works and told us how the situation about the Girijan Rythus(Tribal Farmers). They said that we don't know anything and took videos of other tribal communities and showed them to us. Respondent 1 & 2: Previously Interviewer: Aha. Doing what? Respondents 1: You tribal people are facing these issues and they showed us Videos related to that. Issues like tilling, hill region problems, agriculture they took videos on tribals and showed them to us. Respondent 2 & 3: They showed us those videos Interviewer: Oh. So, there is a lot of ancestral…. things… like… okay. Umm… You said that you want to know more about climate change. Who should lead you to get you to know more? Respondent 1: It will be good if some outsider teaches us about these things Respondent 2: From us, no one will go anywhere. Even if we teach other people, they will not listen to us. [Crosstalk] You should come and teach us. Or else. No one will listen to us. Respondent 1: Even you people saw this. When you called people to come and discuss about issues, people did not come. Why will the people come later? Respondent 2: Just because we want to know, we came. Respondent 3: If the people should listen they will come. Respondent 2: But, generally the people will not listen to us. Interviewer: Oh, so you will listen to people from outside? Respondents 2 & 3: You people should only help. Respondent 2: You should be there, but we also should be there. We should lead from the front and you can support us from behind. Right? Interviewer: Who should lead? So, the whole village she is saying? I need specifics, who, who? Respondents: Who as in, all of us. Even though we are young, our hair greyed up and we are looking old. Small or young, all are of same age and should go together

Consistent with the high level of knowledge and technical capacity resource gaps at population levels that undermine climate change agency (optimism) in these contexts, the data strongly suggests that these resource gaps also undermine the mobilization of communal agency. This is particularly evident in the diminished level of confidence with which climate leadership is reposed communally or along traditional lines that privilege seniority. This observation further underscores my contention that without careful management of the faulty internalization of cause in these traditionally collective contexts, issue specific and contextual climate information

provision mechanisms can undermine communal harmony, which is primarily structured around traditional age and gender patterns in these socio-economically and politically homogenous (all the same caste) contexts. Specifically, the overall data indicates that exemplary persons (27 of 85), external (21 of 85) and youth (15 of 85) are the three main sources of climate change leadership preferred. This is highly significant for the decisiveness with which resource gaps (knowledge, technical capacity and monetary resources) shift confidence from the traditional and communal disposition. All three specified categories, which account for approximately three-quarters of all prevalence for preferred avenues of climate leadership, are comprised of persons believed to have a higher level of education overall (usually a grade or two, ability to affix a signature and/or basic literacy), greater understanding of climate change, or are deemed more capable of learning sufficiently to teach others. This is underscored by self-identification as ideal climate leaders due to self-assessed knowledge advantages and declaration of a greater stake among youth, particularly young men who have been afforded issue-specific informational and technical training, underscores this observation (see excerpts 36 and 43).

This observation is reinforced by distinctions between the village subsets that strongly correlate with levels of resource gaps as well as the overall diminished communal purview relative to tradition, risk perception and motive in both contexts. It gives profound credence to Korma's (1995, cited in Kohler-Rollefson, 1996) contention that "book knowledge and schooling undermine the appreciation of practical indigenous knowledge" (p. 11) and structures. It also suggests that while indigenous knowledge can enable environmental management, per the high levels of credibility established for experiential knowledge and observational acquisition of climate knowledge and the effective mobilization of resources for festivals even in times of scarcity, it is no panacea amidst unprecedented geologic change (Dutse et al., 2015) and its

utility may have been exceeded (Adugna, 1996; Argawal, 1996; Zwahlen, 1996). While both sets of villages repose similar levels of confidence in youth as climate leaders (19 percent in Laya Villages versus 16 percent in PRAGATI Villages), Laya Villages, which exhibit a greater level of resource gaps (46 percent versus 44 percent in PRAGATI villages, relative to other markers of agency), account for all preferences for external leadership in the data.

The comparable levels of resource gaps across the subsets are so operative that PRAGATI villages, which are more collective, based on their maximally communal motive and relatively higher perception of shared risk, also primarily repose climate leadership confidence outside of collective or communal structures. While the overall higher communal disposition in this context precludes explicit specification of external leadership (no prevalence) amidst intractable resource gaps, these collective localities account for the near totality of discrete or specified leadership based on knowledge and technical capacity advantages. Specifically, they privilege climate leadership from exemplary persons (in general and gendered) from any locality (60 percent relative prevalence for the subset and the near totality for the overall dataset, 90 percent) and groups marked by knowledge and capacity advantages (youth - 16 percent).

While groups and exemplary individuals marked by knowledge and technical capacity advantages account for more than three-quarters (76 percent) of preferred sources of climate leadership in PRAGATI Villages, the nature of the greater variation in their climate change leadership preferences also underscores their relatively higher communal or inward-looking disposition. In addition to its tendency to specify exemplary leadership from any source rather than decidedly externalizing preference in any instance, specific reference to community/village is relatively higher (18 percent compared to 14 percent in Laya villages) and it is the only subset where a marker of traditional leadership (age) is accorded confidence for climate leadership.

Specifically, elders account for nearly a tenth (four of 49) of the subset's relative preference for climate leadership and the entirety in the overall dataset. The subset also accounts for the only instances of gendered specification of leadership (exemplary females and exemplary men each with two percent prevalence). These observations are associated with discrete domestic and socio-cultural experiences as all instances were proffered by elderly women in discrete locations (older women in Palem account for both references to exemplary men; older women in Sunaladana and Itikalakota account for one of each reference to exemplary women), who varyingly cite men's penchant for drinking and overall perceived irresponsibility, women's preoccupation with a range of manual work and men's direct involvement with cultivation as explanatory factors (see excerpt 41).

Excerpt 41: Barriers to accessing available climate information, knowledge gaps, and fissures in the social order undermines confidence in traditional and communal structures

Older Women Focus Group Sunaladana, PRAGATI Subset
Interviewer: Would you like to learn more about climate change? Respondents: Yes, but we can't go because of daily agricultural works in our fields. Interviewer: Who do you think should lead your village to learn more about climate change? Respondent 1: Educated persons. Respondent 2: Educated ladies. Respondent 3: Interested persons. Respondent 4: Educated persons. Interviewer: Why educated ladies? Respondent 2: Men are drinkers, so they don't have interest.

The unconditional interpellation of elders is entirely associated with the village of Agraharam, specifically young women who account for three-quarters of the leadership marker's prevalence, alongside their male elders who account for the remainder. This is highly illuminating. Although confined to Agraharam in the Palem subset, for which the data does not show any discernible association with observation or experiential knowledge as a primary knowledge form or initial climate knowledge acquisition source, it emerges in a manner consistent with the prevalence and consequential nature of observation as a form of climate change knowledge among older folks, particularly older men, and its distinctly higher import for young women relative to older women (23 percent compared to 15 percent - see review of

knowledge). Specifically, the young women of Agraharam who solely reposed confidence in their elders as climate leaders also cite stories/tales from their elders. So, rather than a gendered indicator of a more feminine communal disposition or ethic of care, it is more strongly suggestive of a route for knowledge transfer towards young women, who are typically at a gendered disadvantage, where youth-centric engagement efforts are present in a locality and socio-cultural change accrues educational opportunities for youth (young men account for all references to school, per analysis of knowledge acquisition sources).

PRAGATI Villages

Notwithstanding overall consistency in the data, there are discrete village and cohort level observations that reinforce my observation that resource gaps, particularly knowledge and technical capacity, can undermine the mobilization of communal agency where issue specific and contextual climate information provision mechanisms of a limited scope inadvertently reinforce the faulty internalization of cause attribution in low capacity communal contexts. As contended, this in turn magnifies the incapacitation of traditional structures and frays communal confidence and harmony. For instance, PRAGATI Villages show very similar levels of preferences for climate change leadership with the three leading preferences being exemplary person (49 percent), community/village (18 percent) and youth (16 percent). However, Palem and Sunaladana are distinct as there is no prevalence associated with confidence in community/village for climate leadership in Palem and none in youth in Sunaladana. Both Villages also record the highest level of preference for exemplary persons, including gendered specifications) irrespective of age or origin (three-quarters in Palem and 80 percent in Sunaladana), as well as the same level of premium climate knowledge relative to other knowledge markers (50 percent each).

With respect to Palem, both the resource gap and information provision modality are interpellated. The village's maximal deferment of confidence in both the communal and traditional structures correlates with clear evidence of focused information provision and technical capacity enhancement in an issue specific manner in the locality, even among young men, which exceeds that which is discernible in other villages in this subset and the highest level of relative prevalence for resource gaps in the overall PRAGATI subset (57 percent). Though the locality's young women account for no discernible preference for climate leadership, which is consistent with their marginalization in related engagements, it is reasonable to conclude that they share the general leadership disposition observed in the village because of similarities in constrained agency (resource gaps accounts for 60 percent for young women and 50 percent for young men). So, cross cohort (age and gender) commonality in this locality underscores the durability of the population level disposition towards resource deficient traditional and communal structures (informational, technical, monetary, etc.) that underscores the maximalist shift in confidence from all collective internal sources.

Similarly, the distinction observed in the Sunaladana dataset supports the assertion of a link between resource gaps and fissures in confidence in communal and traditional structures. Comparable levels of prevalence for resource gaps (51 percent), which constrains agency, alongside the second highest level of knowledge gaps in the subset (36 percent) accounts for the absence of youth and marginal (second lowest in the subset) support for communal leadership (20 percent) in Sunaladana. The absence of evidence of organized youth structures or specific engagement in this locality also comports with its absence from the dataset.

Agraharam is distinct as the only village in the subset where confidence in the communal and traditional order account for the majority of leadership preference (53 percent). As observed

earlier, Agraharam accounts for all prevalence evident for elders, which is primarily associated with young women (three-quarters), who as established earlier, cite stories/tales from their elders which correlate with a likely pattern of climate change knowledge acquisition for this cohort in the absence of direct engagement. Other than this outlier, the prevalence of resource advantaged non-communal and non-traditional leaders (exemplary person and youth at seven) is almost twice that of the communal (four). However, even in this context where the communal and traditional order retains confidence, the resource gaps, particularly knowledge and broader fissures in the traditional order profoundly undermine confidence as detailed by older women of Agraharam (see excerpt 42).

Excerpt 42: Fissures in the social order, knowledge gaps and broader capability constraints undermines confidence in the traditional and communal order

Older Women Focus Group - Agraharam, PRAGATI Subset
Interviewer: You talk about the rainfall, is there we can do anything about this? Respondents: Rainfalls are slow, Interviewer: Is there anybody most affected by rainfall? Respondents: People who are far away from water bodies they affect most. Interviewer: Who [should] lead you guys to deal with climate change, to teach about climate change? Respondents: Who interested, preferably youth. [Cross talk] If we lead youth will not listen to us. Interviewer: Why [would the] youth not listen to you? Responders: Because of age factor they will not listen to us. They think that, they are [more] knowledgeable than us, and always drunk. They were in state… even not listen us what we saying to them.

Though youth feature as a significant source of leadership in the dataset for PRAGATI Villages across three of the four villages (a quarter of the prevalence for both Palem and Itikalakota and 13 percent in the more seniority-oriented village of Agraharam which accounts for all references to the elderly), varying segments of the study population (age and gender) hold this view. The variation is in large part due to the socio-cultural changes underway that accords educational and issue specific capability enhancement to young people, but primarily young men. Overall, older folks (five of eight), particularly older men (four of eight) are more likely to cite the youth as a repository of potential climate change leadership. At the other end of the spectrum, young women reveal no preference for youth as a potential repository of climate change leadership, unlike their male peers for whom its mention is strongly associated. It is

young men (two in Itikalakota and one in Agraharam) who account for the remainder of the unit's prevalence. This gendered distinction among young people in discrete localities is consistent with the observation of training and educational advantages being variably provided to and readily accessed by some young men. The emergence of the youth category across localities and by non-youth cohorts also highlights the fact that these young men (and potentially young women) represent a significant potential local population to tap as climate leaders and champions.

Laya Villages

The data associated with the Laya subset also supports the assertion of a link between resource gaps of various sorts and fissures in confidence in communal and traditional structures. Overall, four analytical units denoting climate change preferences have prevalence in the Laya villages: external - 21 of 36, youth - seven of 36, community/village - five of 36 and exemplary person three of 36, the most palpable of which is the majoritarian preference for external leadership (58 percent compared to none in PRAGATI Villages). The decisive preference for external leadership in this subset is consistent with its substantially weaker communal disposition, specifically a lower communal motive and an inclination for risk specification including personalization, alongside relatively higher knowledge gaps but greater explicit optimism.

While there is overwhelming explicit preference for external leadership in Laya Villages, it varies widely, such that it only accounts for a clear majority of preference in Pulusumamidi (76 percent, 40 percent in Munagalapudu and 20 percent in Nallikota), all instances conform with the observation of fraying confidence in the traditional and communal social order in a manner directly related to capabilities amidst considerable climate impacts. Pulusumamidi, where the

preference for external leadership is most entrenched, also accounts for the entirety of risk specification in the subset and the totality of personalization in the overall dataset. This low communal outlook and confidence correlates with the villages' intractable level of knowledge gaps (one percent less than Munagalapudu, where it is lowest) and a similarly distinct level of broader resource gaps that undermine agency.

While Munagalapudu, the only village to outstrip Pulusumamidi in terms of knowledge gaps and resource constraints in this subset, is substantially less disposed to seek external climate leadership, the external sources accounts for a plurality of relative preference for climate leadership (40 percent) and the vast majority of its preferences (90 percent) is associated with non-communal and non-traditional groups and individuals noted for their enhanced capabilities (youth and exemplary individuals of any gender and from any source). The higher resource gaps observed in Munagalapudu (53 percent) relative to Pulusumamidi (44 percent) is likely to have had a lower impact due to the perception of cause. Specifically, the data suggests that Munagalapudu, which accounts for all prevalence for attribution of climate change cause in the Laya subset, attributes cause and proximity more equitably between the village and the outside world. In fact, unlike PRAGATI villages which the data suggests internalize/localize cause attribution at the village level, Munagalapudu localizes (village and nation) but shifts responsibility away from the village (nation and international). This significant perceptual valence is likely to structure the confidence with which the village reposes confidence for climate leadership. This comports with the complete absence of explicit preference for external leadership in the PRAGATI subset which internalizes cause but privileges capable groups and individuals in accordance with its comparably higher and maximal collectivity.

Though explicit preference for climate leadership in Nallikota at the communal level

accounts for a plurality of relative preference, groups associated with enhanced capability also account for the majority (60 percent) of its preference (youth, external, exemplary persons). The fact that explicit preference for communal/village leadership is twice that of explicit external preference comports with the village's maximal communal disposition in terms of risk perception and motive, the combination of which is unique in this subset.

As observed with PRAGATI Villages, youth are deemed a potential repository of climate change leadership and at a higher but compellingly similar level (19 percent in Laya Villages compared to 16 percent in PRAGATI Villages). This finding is consistent with Al-Hassan et al.'s (2013) recommendations based on his study of indigenous agronomic climate strategies in Northern Ghana. However, young men feature more prominently as the subset who proffer this preference (71 percent in Laya subset versus 38 percent in PRAGATI Villages) and young women who accounted for zero in the PRAGATI subset account for nearly one-third in the Laya subset (29 percent). Notably, the young women of Munagalapudu who account for the entirety of the preference for youth among young women, specifically cite capabilities, "educated youth… from the village will be better," which comport both with the relatively higher tendency to localize leadership amidst the most intractable resource gaps observed in the subset and a lower tendency to localize cause and responsibility.

Excerpt 43: Self-identification as ideal climate leaders due to self-assessed knowledge advantages exemplifies shifts in the traditional order

Young Men Focus Group - Pulusumamidi, Laya Subset
Interviewer: Do you think anybody in the village is more affected by climate change than anybody else? Respondents: No. Respondent 2: No, all of us face the same issues. Interviewer: Oh, okay. Great. Is climate change something we can do anything about? Respondent 1: We can't do anything about it. Respondent 2: When the person in front is telling, sir, we will try to follow. But we can't. Interviewer: Yeah, so you'd like to learn more about climate change? Respondents: Yes. Interviewer: Who do you think should help to lead, who in the village should lead on, or in general should lead on getting you to learn more about climate change? Respondents: Youth. Interviewer: The youth should? Why should the youth do it? Respondents 1: Because the elders did not study much and we studied something at least, we will learn and teach them.

Angst: Complex Challenges

Table 41: The relative prevalence of the range of ranked and unranked complex concerns across study populations in India

Subset	Village	Ageing		CC Impact		CC Impact - 1		Drainage		Education		Electricity		Fevers and Diseases		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Laya	Pulusumamidi	1	3%		0%	5	14%		0%	5	14%	1	3%		0%	37
	Nallikota	0	0%		0%	1	9%		0%		0%		0%		0%	11
	Munagalapudu	1	7%		0%		0%		0%	1	7%		0%		0%	15
PRAGATI	Agraharam	4	10%		0%	1	3%		0%		0%		0%	4	10%	40
	Itikalakota	0	0%	1	2%	7	16%		0%		0%		0%		0%	43
	Palem	0	0%		0%	12	19%		0%	1	2%	5	8%	3	5%	63
	Sunaladana	0	0%		0%	4	15%	1	4%	2	8%		0%	3	12%	26
	Totals	6	3%	1	0%	30	13%	1	0%	9	4%	6	3%	10	4%	237

Subset	Village	Flooding		Food Security		Health Centre		Housing - 1		Land		Local Institutions		Market Access		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Laya	Pulusumamidi	0	0%	1	3%	0	0%	0	0%	1	3%	0	0%	0	0%	37
	Nallikota	0	0%	1	9%	1	9%	0	0%	0	0%	0	0%	0	0%	11
	Munagalapudu	0	0%	1	7%	2	13%	0	0%	0	0%	1	7%	0	0%	15
PRAGATI	Agraharam	5	13%	2	5%	2	5%	0	0%	0	0%	0	0%	0	0%	40
	Itikalakota	11	26%	1	2%	0	0%	0	0%	2	5%	0	0%	0	0%	43
	Palem	0	0%	4	6%	3	5%	1	2%	3	5%	4	6%	0	0%	63
	Sunaladana	1	4%	0	0%	2	8%	0	0%	1	4%	0	0%	0	0%	26
	Totals	17	7%	10	4%	10	4%	1	0%	7	3%	5	2%	2	1%	237

Subset	Village	Money Lenders		Over Population		Road		Sanitation		Storage Facility		Streetlights		Transport		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Laya	Pulusumamidi	3	8%	0	0%	9	24%	1	3%	0	0%	0	0%	1	3%	37
	Nallikota	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	1	9%	11
	Munagalapudu	0	0%	0	0%	3	20%	0	0%	0	0%	0	0%	2	13%	15
PRAGATI	Agraharam	1	3%	0	0%	5	13%	0	0%	0	0%	0	0%	5	13%	40
	Itikalakota	1	2%	1	2%	1	2%	0	0%	0	0%	0	0%	0	0%	43
	Palem	1	2%	0	0%	3	5%	0	0%	1	2%	0	0%	3	5%	63
	Sunaladana	0	0%	0	0%	3	12%	0	0%	0	0%	2	8%	0	0%	26
	Totals	6	3%	1	0%	24	10%	1	0%	1	0%	2	1%	12	5%	237

Subset	Village	Undeclared - 1		Village Issues - 1		Water Scarcity		Water Scarcity - 1		WIld Animals		Work		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Laya	Pulusumamidi	0	0%	0	0%	9	24%	0	0%	0	0%	0	0%	37
	Nallikota	0	0%	1	9%	5	45%	1	9%	0	0%	0	0%	11
	Munagalapudu	0	0%	1	7%	2	13%	0	0%	0	0%	1	7%	15
PRAGATI	Agraharam	0	0%	0	0%	9	23%	0	0%	0	0%	2	5%	40
	Itikalakota	0	0%	4	9%	5	12%	0	0%	0	0%	9	21%	43
	Palem	1	2%	0	0%	9	14%	0	0%	3	5%	6	10%	63
	Sunaladana	0	0%	1	4%	6	23%	0	0%	0	0%	0	0%	26
	Totals	1	0%	7	3%	45	19%	1	0%	3	1%	18	8%	237

The highly consequential implications of climate resource gaps of a technical, monetary, informational and logistical nature in these low capacity resource-dependent localities, where climate change impacts are perceptually and functionally noted for undermining subsistence, climate agency and the traditional and communal disposition, are compounded by profound levels of complex and interlinked challenges (angsts) that are varyingly associated with climate impacts. On one hand, there are socio-political and economic challenges (such as exploitative and predatory money lending that entraps the vulnerable who mortgage possessions and even themselves through bondage systems in a bid to secure temporary support for subsistence and/or fund definitive rites of passage (marriage, religious festivals, etc.) that are independent of climate variability, but disrupt even moderate coping responses to extract profit) that undermine already low information provision and exacerbates knowledge gaps (see excerpt 44). Such factors highlight the deeply political nature of climate adaptation activities (Moser, 2010; Pelling, 2011) and underscore my theoretical design that privileges a multi-perspectival and systemic approach to adaptation responses that transcends scientific and technical considerations in favour of a social change agenda. Moreover, there are also discernible difficulties in substantial segments of the study population to recognize how their wide-ranging complex and interlinked challenges are connected to the phenomenon and their ability to logically rank them against climate change as a primary challenge. This underscores consensus in the literature that climate change impacts cannot easily be isolated because they interact in complex ways (Paavola, 2006; Pelling, 2011) and are readily perceived as such in contexts where knowledge and practices are holistically interpreted and experienced (Galloway, 2010).

As observed in the previous chapter, this is important as expressions of angsts, which are even more extensive in this case study (10 in Fiji versus 27 in India), have a high prevalence in

the dataset, such that the 35 analytical units used to gauge the issues of greatest concern to the study population is the most expansive set in this study (see table 41). So intractable and cross-cutting are these concerns that for analytical purposes, they necessitated isolation from signs and indicators and other thematic groups. The coexistence of discernible local manifestations of these complex climate impacts alongside profound knowledge and broader resource gaps and a dominant knowledge seeking disposition contradicts Nisbet's (2009) assertions that people dismiss the urgency of climate change because of its complexity. In fact, the data shows that the discernibility of complex impacts at a subsistence level often structures opinion intensity so decisively that amidst resource gaps it is compelling socio-cultural changes in the collective and traditional order (see climate leadership) and prevails in the absence of all elements of climate denialism. Theoretically, this illustrates the strong possibility that complexity and profound discernible impacts rather than accurate knowledge of causes of climate change are the most powerful predictors of intention to take voluntary actions in low capacity resource-dependent contexts where climate impacts are manifesting in ways that undermines subsistence. This is in accordance with Leiserowitz (2003), who found no noteworthy link between accurate knowledge of climate change cause and solutions and reported or intended actions, rather than Bord, O'Connor and Fisher (2000, cited in Maibach, 2008), who established that accuracy of knowledge of cause is the primary predictor of action.

Twenty-seven codes indicating angsts or primary concerns have prevalence in the overall dataset. However, 12 of these concerns are unique to circumscribed localities, primarily in the Laya subset (three-quarters). Overall, Water Scarcity is the most grounded angst, accounting for a combined total of a fifth of the prevalence of all angst in the dataset (46 of 237: Water Scarcity (45) and Water Scarcity-1 (one)). It also ranks as the most grounded angst in the dataset for each

set of villages (25 percent for Laya Villages and 17 percent in PRAGATI Villages, which is consistent with the nature of the two primary ways through which climate change impacts are perceived in this resource-dependent context where rainfed agriculture is a mainstay (crop yield and weather) and modern water connectivity infrastructure is absent. Overall Climate Impact (31 of 237 (combined – ranked and unranked)), Road (24 of 237), Work (18 of 237), Flooding and Transport (12 of 237) are the only angsts to account for at least five of the relative prevalence for Angst. So, these dominant angsts will form the basis of scrutiny. However, angst rank varyingly across the two subsets in terms of prevalence beyond the first ranked concern, which is consistent with my observations of both the contextual nature of communal concerns, climate impact, response modalities and even engagement/mobilization approaches. Accordingly, a closer look at subset and discrete village data is warranted.

Excerpt 44: Profit seeking moneylenders obstruct climate resilience coping strategies and undermines information provision and knowledge gaps

Young Women Focus Group - Pulusumamidi, Laya Subset
Interviewer: So, did, does Laya use the words climate change to you? Respondent 1: Yes. Interviewer: What did Laya tell you about climate change? Respondents 1: What do they tell? Nothing much. They tell us mostly about agriculture, agriculture. Interviewer: They talk, what do they say? Respondent 1: They tell us about agriculture and also if we need anything, they us, the people. About the weather means they tell us about rains if they will fall. Weather, weather change means, we are poor people, right? You are given the seeds from the Devasthanam (Religious Trust), grow the crops well. Respondent 2: They told us like you told us about changes in weather and the crops will grow better. Respondent 1: Farm lands, Weather, Laya foundation told us not to put any fertilizers and grow the crops. But, the money lenders tell us to put these fertilizers, if you do not put the fertilizers, the crops will not grow better. But, Laya foundation people told us to use the natural manure which they prepare and send, and the crops will grow better. With the use of chemical fertilizers you people, you people will get some diseases.

PRAGATI Villages

Of the 27 codes denoting Angsts that are active in the overall dataset, only 24 are active in the PRAGATI subset. While Food Security-1, Sanitation and Water Scarcity are inactive, both angsts with the "-1" designation are indicative of rank relative to climate change to probe knowledge operationalization amidst complex realities. So, though they show no prevalence as first order concerns, the specific issues they denote show prevalence in the dataset. Water Scarcity (17 percent), Climate Impact (15 percent – combined), Climate Impact (24 percent) and

Climate Impact-1 (one percent), Work and Flooding (10 percent each), Road (seven percent) and Fevers and Diseases (six percent) are the most significant angst in the subset, accounting for prevalence in excess of five percent. At a general level, the fact that the specification of climate impact as a first order concern only accounts for four percent of the prevalence associated with climate impact (one of 25) in a context where the core concerns are induced and/or exaggerated by climate change profoundly underscores the knowledge gaps in these contexts.

This is even more apparent across villages given the highly contextual nature of this socio-cultural and climate change perceptual lens. The individual units of analysis used to capture angsts register varyingly and collectively, they register significantly different levels of prevalence across circumscribed localities. Specifically, although all villages, except Palem (17) register 11 codes denoting angst, only three have prevalence across all four villages (Water Scarcity, Climate Impact-1 and Road) and only seven register prevalence in at least three villages (Work and Flooding - 1 each, Road - 12, Fevers and Diseases - 10, Food Security and Health seven each, Land - six and Money Lenders - three. They are also variably accounted for by specific gendered and age groups, which further reinforces the contextual nature of angsts in the dataset. However, there is no decisive overall correlation between gender and angst because men (54 percent) and women (46 percent) account for similar levels of angst. The marginally higher level associated with men comports with their higher level of premium climate knowledge overall. In fact, men account for nearly 80 percent of the demonstrated ability to rank climate-impact as the primary concern when asked to compare their stated concern (the core of which are climate induced/exacerbated challenges) with climate change. Climate knowledge appears so directly related to this factor that both cohorts of men account for similar levels of prevalence (42 percent for older and 38 percent for younger men), but nearly 50% (four of nine) of this

demonstration of knowledge operationalization among young is accounted for by those from Palem, who have had the rare benefit of direct engagement and capability enhancement.

Similarly, in much the same way capability enhancement among discrete cohorts rather than gender per se accounts for expression of angsts and the effective operationalization of climate knowledge to rank concerns relative to climate impact, the data shows seniority and leadership designation rather than age accounts for the expression of angsts. Older folks account for marginally more (52 percent) of the prevalence of Angsts than young people (48 percent) and all groups, except young women, account for at least a quarter of prevalence. The fact that young men, who account for the most prevalence (27 percent), outpace older men (27 percent and older women (25 percent) outpace younger women (21 percent) underscores this observation. What this indicates is both a relationship with responsibility, which is associated with seniority (older men and women) and communal validation of self-identification for leadership (see excerpt 43) alongside explicit expressions of a greater stake among young men in Munagalapudu (see excerpt 36). In the latter instance, this is reinforced by the fact that young men from Palem account for more than 40 percent of total angsts expressed by their peers in the subset and they both self-identify and are validated as potential climate leaders.

Capability enhancement, particularly knowledge, appears to function similarly even at a population level. Consistent with the highly contextual nature of angsts observed, Water Scarcity, the most grounded angsts in the dataset, is only so primarily grounded in Sunaladana and Agraharam. These are the two villages with the highest levels of knowledge gaps in the subset (a half in Agraharam and a third in Sunaladana) and despite the manifest connection between their primary concerns and climate variability they are less likely to rank climate impact as their first order concern in terms of relative prevalence for angsts (Agraharam three percent

and Sunaladana 15 percent). In Palem and Itikalakota where knowledge gaps are lower, accounting for just more than a tenth of relative prevalence for knowledge markers (13 percent and 11 percent, respectively), climate impact accounts for higher – 19 percent and 16 percent, respectively. In fact, climate impact as a ranked concern is the most grounded relative to all angsts expressed in the village and though flooding is the dominant concern in Itikalakota, it is the only context where climate impact is specified as a concern without prompting. Broader aspects of capability enhancement, including specialist knowledge, technical know-how, monetary and logistical support, the scope of which exceeds the informational and technical affordances of PRAGATI's efforts also structure the expression of angsts at a population level. Specifically, Angsts are greater in the villages with the lowest knowledge gaps (Palem and Itikalakota), but these villages also show among the most intractable levels of explicit fatalism (absence of agency). Specifically, Palem is the most fatalistic; Itikalakota, despite its vastly lower level of knowledge gaps (11 percent) relative to Agraharam where it is highest (50 percent), shows comparable levels of fatalism and angsts with Agraharam (40 percent fatalism compared to 45 percent and 43 angsts compared 40, respectively in each village).

The high levels of angsts observed across villages and its comparable prevalence across age and gendered cohorts, as well as, the prevalence of palpable resource gaps and a measure of fatalism across cohorts, including those with knowledge and broader capability advantages, strongly underscores the consequential nature of information provision. Specifically, insufficient, issue and context specific climate information provision in low capacity resource-dependent communal contexts is also likely to undermine agency and collective motive by causing disenchantment, even among the relatively knowledgeable and skilled. The likely negative implications of this approach for mobilizing agency and enabling effective action consummate

with the challenges underway and projected is heightened when considered alongside observations of its relationship with fissures in the communal order, by exposing the intractable incapacitation of collective and traditional structures to lead and act on current subsistence challenges that are projected to intensify without the provision of pathways for accessing the necessary resources and faulty internalization of cause attribution and responsibility.

Laya Villages

These observations are reinforced by the data associated with the Laya subset. Consistent with the observation of a direct link between knowledge levels and perception and management of the complexity of climate impacts in these low capacity resource-dependent localities, the Laya subset, which has higher levels of knowledge gaps and lower premium climate knowledge, only accounts for a fifth of the knowledge operationalization observed in terms of linking and ranking primarily climate induced and/or exacerbated concerns against climate change. This is also consistent with the view that information provision, especially if insufficient—even if more profuse and diffused—without the necessary resources to address problem identification, undermines agency, motive, the traditional and communal order and causes disentrancement. This is precisely the implication when both subsets are compared.

The relatively more knowledge deficient Laya villages are less perturbed, accounting for less than a third of all angsts in the overall dataset. As established in the previous sub-section, the Laya villages are also less fatalistic (26 percent versus 36 percent PRAGATI Villages) and their relative level of explicit optimism is greater than what obtains in the PRAGATI subset (a quarter compared to 15 percent). This scenario supports the observation of a knock-on attenuation of confidence in the traditional and communal order even though it is the Laya villages that explicitly externalized leadership because socio-culturally PRAGATI Villages are far more

communal, per higher collective risk perception, the absence of personalization of risk and maximal communal motive. As established in the previous sub-section, this is also apparent at the village level.

There is also corroboration at the village level for a link between knowledge operationalization and perception and management of complex challenges in terms of linking and ranking expressed angsts that are climate induced and/or exacerbated with climate change (see excerpt 28). Munagalapudu, the village with the lowest level of climate knowledge (highest knowledge gap and nearly no premium climate knowledge) is the only village in the subset where no respondent associated or ranked their expressed angsts with climate change. The village explicitly ranks Road as the most grounded angst (three of 15), which accounts for a comparable level of prevalence with Water Scarcity (two of 15) alongside Health Centre (two of 15) and Transport (two of 15). This is highly significant and underscores the link drawn with knowledge operationalization, as the village does not link and/or rank climate impact as a dominant concern even when probed. This is despite Water Scarcity's manifest connection with climate impact and their pronounced concerns about subsistence challenges (see signs and indicators) in this rainfed agriculture dependent locality and their expressed concerns about transportation and broader accessibility issues when it rains or floods.

Consistent with its relatively higher premium climate knowledge and lower knowledge gaps, the linking and ranking of climate risk in Nallikota accounts for a greater share of total expression of angsts than in Pulusumamidi. Further, this expression of knowledge mobilization is entirely associated with older men and young men, who show higher relative levels of premium climate knowledge and lower knowledge gaps overall. But, even within these relatively more knowledgeable cohorts across these low capacity contexts, knowledge and broader capability

constraints undermine perceptual management and action on complex challenges, including those manifestly associated with climate impact and variability such as water scarcity (see excerpt 45).

More generally, the cohort level variations are also indicative of the broader contextual nature of the expression of angsts due to the variable ways in which climate change impacts are distributed, actions enacted and perceptions are grounded. A third of the codes denoting angsts in the overall dataset that have prevalence (nine of 27) are inactive in the Laya subset. Of the 18 active codes denoting angsts that have prevalence in the subset, only three register prevalence across all three villages: Water Scarcity (16 of 65), Transport (four of 65) and Food Security (three of 65). In addition, though the subset is only comprised of three villages, only five angsts register in two villages (CC Impact-1 (six of 63), Education (six of 63), Health Centre (three of 63), Ageing (two of 63) and Village Issues-1 (two of 63), which means less than half (eight of 18) of the active codes in the subset have prevalence in at least two villages.

Consistent with the cohort associations notable alongside knowledge mobilization, angsts are variably accounted for by specific gendered and age groups in general, which further reinforces the contextual nature of angsts in the dataset. However, there is no overall correlation between gender and angst as men (five percent) and women (48 percent) account for similar levels of angst. Age correlates more strongly with expressions of angsts. Older folks account for nearly 60 percent (36 of 63) of angsts' prevalence, which also obtains when the data is disaggregated. Specifically, older men account for significantly (eight percent) more prevalence than young men (19 of 63 versus 14 of 63) and older women also significantly (six percent) outstrip young women (17 of 63 versus 13 of 63).

However, as observed in the PRAGATI subset, responsibility associated with seniority

(older men and women) and self-designation and validation are likely significant factors here given the age distinction noted and the fact that young men, who are socio-culturally privileged for leadership, engagement, education and broader capability enhancement opportunities narrowly outstrip young women and express concerns at comparable levels to older men. The apparent comparability of young women and young men in this subset is also supportive of the observation that the expression of angsts is more associated with leadership and seniority as the only expression of preference for youth as climate leadership in the entire dataset is associated with young women in the Laya subset who notably cite educational capabilities (see subsection on Climate Leadership).

Also consistent with the observations in the PRAGATI subset is the highly contextual nature of angsts. Water Scarcity, the most grounded angsts in the dataset, is the most grounded angsts in two villages but only uniquely so in one—Nallikota (five of 11 – all other active angsts register single instances of prevalence). In the second village, Pulusumamidi, it shows the most prevalence, but not solely. Road accounts for the same level of prevalence (nine of 37 each). As noted, Road is explicitly ranked as the most grounded angst in Munagalapudu (three of 15) and though Water Scarcity (two of 15) ranks second in the village subset, it does so alongside a medley of other angsts that are equally grounded (Health Centre and Transport).

Excerpt 45: Knowledge and broader capability gaps undermines perceptual management and action on complex challenges including those manifestly associated with climate change impact and variability

Older Men Focus Group - Nallikota, Laya Subset
Interviewer: What are the two biggest problems in your village? Respondent 1: Drinking water scarcity in summer. Respondent 2: We have to beyond the hill to get water. Respondent 3: Transportation is also here, we don't have vehicles. Interviewer: Where do you get water from now? Is that from pipe? Respondents: We get water from well and hand pump. Interviewer: Do you think water problem is climate change problem or not? Respondent: No. [Cross talk] We have water in rainy season, in summer we have water scarcity. We see every year. Interviewer: Do you think your community want to know more about climate change? Respondents: We want to know, but we don't have anybody to teach. Interviewer: Who should lead your community to teach about climate change? Responders: We want educated person. Interviewer: That person should come from your community or outside or it doesn't matter? Respondents: It doesn't matter to us. Interviewer: What is the cause of climate change? Respondent 2: Because of uneven rainfall

Interviewer: What is the cause of uneven rainfall?
Respondent 2: We don't know.

Conclusion

Notwithstanding the relatively small sample sizes across project associated populations, this chapter offers considerable theoretical and practical insights into the affordances and limitations of two rights-based, integrated rural development initiatives with substantial climate adaptation and mitigation components that are being implemented with varying degrees of explicit reference to climate change and accompanying information across seven Adivasi tribal hamlets in southern India. It illustrates that irrespective of the visibility of the integration of climate change into the interventions, the issue, context and domain specificity with which they are conceptualized and varyingly implemented have had limited impact in boosting capability at a population level—specifically climate knowledge, agency and action at both perceptual and active levels. Where deployed, both PRAGATI's contingent and unstructured issue-specific response mechanism with conditional provision of deeper explanations and Laya's special programmes for cohorts and highly selective youth outreach have had positive impacts on climate knowledge that are operationalized across critical dimensions associated with identification of signs, cause, risk perception, motive and agency.

The study shows a significant positive correlation between experiential knowledge (informal) and higher premium (a posteriori) climate knowledge where a broad tapestry of information (chiefly, formal) is available and accessible to a wider cross-section of people. The availability of a range of credible information structures experiential knowledge positively, which comports with robust assertions of the legitimacy of indigenous knowledge premised on experience and practice. While this form of knowledge is primarily associated with ascendancy in age, evidence of climate knowledge transfer between older men and young women suggests leveraging observational knowledge to boost capabilities and action transcends target groups

privileged by common-sense notions. However, the nature, frequency and scope of available manifestly credible sources is likely to be determinative. Whereas the project intervention presents climate change with issue, context and domain specificity that narrows the scope of knowledge provided or negates it altogether in favour of a subsistence-response frame, news coverage of climate change (chiefly radio broadcasts) as a translating process from scientific to public audiences is more general and descriptive of a wider range of issues, domains and contexts. This means the effectiveness of frames is contingent upon structural factors (their nature, frequency, scope, availability and access); particularly, multiple relevant frames rather than singular frames, as well as associative information during all forms of response efforts, are likely to be more effective in attenuating knowledge gaps in predominantly low capacity contexts.

The chapter also offers compelling evidence that in an era of post-normal science, the socio-cultural is as important as physical and biological limits in boosting capabilities amidst unprecedented geological change and achieving sustainability. In terms of capabilities, this is evident from the vantage point of gender and age, risk disposition, motive and leadership preferences. Several factors have reinforced intractable levels of knowledge gaps and agency among women, particularly older women, namely the limited, selective and contextually dependent cohort-level engagement, particularly those aimed at women and youth. Additionally, general community/population-level (e.g. village meetings) modalities do not automatically attract women due to domestic commitments and other time constraints, and cultural and socio-spatial barriers often curtail the extent to which they participate even when they attend, primarily functioning differentially when women join.. These broad socio-cultural factors have also limited women's access to the broader tapestry of manifestly credible sources of climate information

shown to be potentially decisive in attenuating knowledge gaps due to its multi-frame nature (news). This reinforces the knowledge gap hypothesis but accords it a fundamentally gendered and youth (to a lesser degree) dimension.

Consonant with the primacy of sociotropic motives delineated in political science, rather than individual motivation in risk communication, the analysis foregrounds the prominence of compelling collective motive and communal risk disposition, which exists alongside a faulty internalization of cause. Owing to the significance of observation for knowledge development, the highly proximal and discernibly existential manifestation of impacts in these contexts, which are perceived in primarily food security and health terms, the chapter suggests privileging the internal risk disposition rather than external and scientific perspectives to effectively boost adaptive capacity. However, of great import, it warns that the communal disposition should be carefully managed as the internalization of risk is often associated with specified actions, including faulty acts such as defecation—which, if associated with distinct groups, can further undermine communal harmony in a low-information context where traditional structures are fissuring. It is also likely to negatively impact climate agency, which is highly constrained by informational and other capability deficits.

This is reinforced by strong evidence of informational and broader resource gaps undermining the mobilization of communal agency, particularly the decisiveness with which resource gaps (knowledge, technical capacity and monetary resources) has shifted confidence from the traditional and communal order. Significantly, the analysis highlights that a lack of or constrained agency does not necessitate fatalism. Contrary to the western-centric literature on individual barriers to communicating climate change in low-capacity, resource-dependent contexts where subsistence is fundamentally impacted, curiosity and a knowledge seeking

disposition are palpable to the extent that even the traditional order is reimagined, according privileges to relatively knowledgeable cohorts such as young men, who disproportionately benefit from emerging capability enhancement opportunities.

More broadly, the primacy of the socio-cultural in tackling the impacts of post-normal science is reinforced by evidence of its utility for boosting adaptive capacity and achieving sustainability—particularly, the possibility of using Vittanalapanduga and other religious festivals that are integral to Adivasi existence to boost food security and manage and diversify crop varieties in these contexts because of the scale of their direct relationship with various stages of agronomic activities, as illustrated by Appendix N.1 to N.5. While this relationship has been used to successfully navigate resource constraints and enact festivities, resource gaps of varying forms and the scale of challenges undermine leveraging the links to enhance routine capabilities and needs.

So, the deployment of a socio-cultural elicitation and analysis of the collective risk disposition and motive, in relation to perception of cause, leadership, agency and angsts, etc. can attenuate critical gaps in climate risk communication about the needs of marginalized communities not afforded by highly discursive and conceptual psychometric approaches used to examine dimensions of climate change and individual perceptions. It is an unambiguous indication that attenuating climate change knowledge gaps and associated capabilities necessary for effectively boosting agency and action requires more than cogent translation of science and information provision, even through highly resonant frames.

Chapter Eight: Belizean Case

Small islands and low-lying developing states across the Caribbean and Central America are among the most vulnerable to climate change impacts. Their small sizes, open economies, high reliance on natural resources and indebtedness exacerbate their risk to a changing and variable climate. Belize, which is as geopolitically and culturally complex and significant as it is ecologically, typifies how climate-induced challenges exacerbate the region's existing economic, social and natural frailties and complicates policy-making as states pursue development objectives. This small, ethnically and linguistically diverse Central American country of approximately 300,000 people, which is more culturally, economically and politically aligned with its anglophone Caribbean neighbours because of a shared colonial heritage, is home to the majority of the Mesoamerican Barrier Reef System, the world's second longest reef system, that supports fragile ecosystems. Belize's status as a critical frontier of world ecology is also reinforced by immense land-based assets. Under complementary policy and system plans, 103 clusters of forestry spanning at least a quarter of the country forms a vast national protected area system (NPAS) that supports one of the widest arrays of species in the Americas (PACT, 2017). While a mainland territory, more than 1,600 small islands, including significant population centres, are also nestled along its extensive low-lying coastline.

Despite being a net sink for greenhouse gases (absorbing more than it emits), Belize's wide-ranging regionally and globally significant sensitive natural assets and high exposure to natural hazards, including being prone to hurricanes and other natural disasters, ranks it among the states most likely to be adversely affected and least likely to develop adequate protective mechanisms (IPCC, 2007). The country's existing and projected climate impacts includes sea-level rise—a one-metre increase of which threatens three-quarters of the properties in the country's vital tourism sector, half of all airport and seaport infrastructure, other critical

infrastructure and its primarily coastal population, a third of which is concentrated in the chief commercial hub of Belize City, which is below sea level (Simpson et al., 2012). More intense and frequent tropical storms, hurricanes and floods are also projected, which necessitates both mitigation and adaptation actions that include comprehensive management and protection of marine, coastal and land assets, infrastructure and human security given the population's concentration in coastal centres and the natural resource base of the economy. The scope of the mitigative and adaptive actions required are typified by recent hydro-meteorological events, namely Hurricane Richard in October 2010, flooding in 2008 and Tropical Storm Arthur in May 2008, that resulted in significant losses to productive sectors such as agriculture, which is vulnerable to even minor shifts in temperature and rainfall, both of which are expected to change significantly. Agriculture, the country's third largest foreign exchange earner behind tourism and petroleum, is already being impacted by water scarcity, more frequent droughts and greater incidence of pests and diseases that constrains timely and effectively propagation and maturation of crops, including stables such as rice, maize and beans and render some varieties unviable (Simpson et al., 2012). So significant are these direct livelihoods impacts that the country explicitly contends that climate variability and change undermine sustainable development goals (Liliendaal Declaration, cited in CCCCC, 2010).

Belize's high socio-economic and physical exposure undermines its response mechanisms because they require significant and sustained investment that it can ill afford on its own. Fiscal complications, including two debt defaults in a decade alongside limited economic growth and intractable levels of poverty, have so constrained the imagination of socio-economic planners that they prompted the proposed decisive petro-economic reorientation of the economy, including oil exploration along the Barrier Reef on which its current economic base depends

(Hall, 2018) and other infrastructure projects in ecologically sensitive areas.

However, concerted civil and legal challenges thwarted such efforts and significant adaptive and mitigative actions are underway in Belize that reflect the regional position on climate change as expressed in the Liliendaal Declaration and complements the priority sectoral actions outlined in the Regional Framework for Achieving Development Resilient to Climate Change and the associated Implementation Plan that guides climate change policies and actions across the Caribbean Community, a regional integration movement to which Belize belongs. The foundational policy and action plans highlight current and projected climate risk and their direct livelihoods impacts as critical factors undermining sustainable development goals (Liliendaal Declaration, 2009). So, despite being a minute emitter of greenhouse gasses, the Caribbean's multi-sectoral plan privileges a strategic shift towards a low carbon economy. Fossil fuel consumption, a major driver of climate change, costs US$37 billion of its already limited foreign exchange earnings and further reduces the potential for economic growth (CCCCC, 2015). This primarily mitigative action, which also improves climate adaptivity, is complemented by cross-sectoral emphases in agriculture, tourism, coastal sector and health.

Table 42: The climate interventions with their associated discrete and combined field sites, implementers and funders in Belize

Country	Project Name	Implementer	Funder	Villages	Village Subset
Belize	The Cohune Palm Nut Renewable Energy Project	Caribbean Community Climate Change Centre	European Union (EU)	Flowers Bank	CCCCC
	The Ya'axché Agro-forestry Project	Ya'axché Conservation Trust	United Kingdom Department for International Development (UK-DFID)	Trio, Indian Creek, and San Miguel	Ya'axché

Accordingly, this chapter probes the implementation of two distinct climate interventions in geographically and ethnically distinct traditional (Creoles) and indigenous (Quiché Maya) communities in central and southern Belize, respectively, that, in the first instance, primarily reflects the region's low-carbon objectives and, in the second, foregrounds livelihoods

considerations that underpin the sustainable development considerations in the foundational documents (see Table 42 and Appendix D). Both Quiché Maya and Creole communities represent two of four major ethnic groups in Belize, but consistent with this study's explicit focus on climate change impacts and responses on the margins, the four villages studied were selected because they uniquely reflect a combination of socio-economic marginality, heightened exposure to climate impact and the efficacy of ongoing climate action emblematic of regional prioritization.

Akin to both the Fijian and Indian cases, this study is grounded on qualitative analysis, including textual examination of project documents associated with the two climate change initiatives underway in my study sites, including communication aimed at my units of analysis during the project, extensive participant observation, several site visits to project installations, as well as 15 semi-structured focus groups with project beneficiaries and contextual insights from several unstructured conversations with project leaders that were conducted over a two-month period under immersive conditions. As detailed in the methodology chapter, both focus groups and individual interviews were conducted using a common set of guiding questions (See Appendix O). These direct engagements with the study population yielded a sample population of 74 (see Table 43) drawn from the four field sites (see Appendix G for village level sample profile and data). While the sample size is just under a fifth of the total adult population and households in the combined field sites, its representativeness is buttressed by equal levels of engagement across gendered and age categories.

Table 43: The Belizean sample profile based on the adult population and households across field sites.

Belize	Adult Pop. in Field Sites	Sample	Households in Sites	Households Sampled	Men	Women	Focus Groups	Youth
Total	438	74	449	70	37	37	15	35
	Rates	17%	16%		50%	50%		47%

Structurally, the case is also formatted in accordance with an integrated typology that combines the two elements (transcript and project codes) of the thematic logic order (see Table 44), a non-random procedure devised to analyze project and interview data and identify the decision-making processes that underpins climate action and inaction at the village level. However, the analytical units gender and traditional practices, alongside other macro-group dynamics, such as youth and age, are progressively integrated because of their high and comparatively more significant resonance in the dataset for this country case. As outlined under paradigmatic considerations in the methodology chapter, this typology is consistent with Gladwin's (1980) study of non-adoption of agronomic recommendations. All codes and themes are defined in Appendix A, and macro group data are outlined in Appendix M.1 to M.12 for Belizean study sites.

Table 44: The integration of the thematic logic order to inform case structure

	Thematic Logic Order for Non-Random Data Analysis	**Integrated Thematic Logic Order**
	Transcripts	**Case Structure**
	Climate Action	Project (Type and) Framework
	Knowledge	Project Activities
	Climate Knowledge Acquisition	Project Action and Causes Profiled
1.	Signs/Indicators	Belief Progression
	Cause and Proximity	Project Outcomes
2.	Climate Risk	Project Perception
3.	Climate Agency	Personal Inclusion and Influence
4.	Motive for Action	Knowledge
5.	Climate Leadership	Climate Knowledge Acquisition
6.	Project Perception	Signs/Indicators
7.	Personal Inclusion/Influence	Climate Action
8.	Belief Progression	Cause and Proximity
9.	Angst	Climate Risk
10.	Traditional Practices	Climate Agency
11.	Gender	Motive for Action
12.	Schooling	Climate Leadership
13.	**Project Documents**	Angst
	Project Framework	
	Project Activities	**Cross-Cutting**
	Project Action and Causes Profiled	Gender
	Project Outcomes	Traditional Practices

While both projects have substantial livelihoods components that seek to boost the capacity of communities to contend with climate change and variability, they differ significantly in intervention frame (adaptation versus mitigation), scope, nature and the degree to which they explicitly address climate change.

The Ya'axché Agro-forestry Project

The Ya'axché Project is an adaptation intervention that promotes sustainable rural livelihoods through comprehensive agro-forestry actions in the Maya Golden Landscape and Maya Mountain North Forest Reserve of Toledo District in Belize. This agro-forestry intervention, which combines agriculture and forestry to prevent soil erosion and boost biodiversity, indirectly benefits 5,500 people who live within six villages across the Maya Mountain Corridor, an extensive protected area. The corridor also includes the Bladen Nature Reserve, the crown jewel of Belize protected areas and a Mesoamerican biodiversity hotspot that has been accorded the International Union for Conservation of Nature's (IUCN) highest protection status. While the project is funded by external entities, namely the UK DFID and the CCCCC, Ya'axché Conservation Trust, which was institutionalized by Mayans for the promotion of ecologically sensitive activities, privileges sustained, direct and targeted engagement with more than 200 direct beneficiaries. A mixture of direct engagement mechanisms—including individual and collective demonstration farming, trainings, extension-related services, routine group meetings at the village level, selective international learning exchange opportunities, as well as collective and self-management monitoring systems—are used to promote a range of actions: the elimination of slash and burn farming to reduce deforestation for agricultural purposes, improved farming practices, energy conservation, watershed protection, soil development and climate smart practices. The climate-smart practices

include plant selection, replanting barren areas and management to simultaneously improve food security and safeguard a national carbon sink amidst climate change and variability.

Ya'axché's targeted, sustained and direct approach to agro-forestry oriented climate adaptation primarily focuses on experimentation at the pace of those engaged, particularly through the planting of cocoa and coffee to capitalize on high global demand to increase farmers' income. In excess of 30,000 cocoa plants have been cultivated to date. The intervention also includes the harvesting of mature trees as a source of timber for home and commercial use, planting fruits, vegetables and root crop to simultaneously enhance food security and income by stabilizing and restoring soil fertility. Smart farming practices have also been introduced that are as important for the environment as they are for income generation. These innovative farming practices include the planting of widely spaced rows of trees with companion crops (alley cropping) and the cultivation of some crops primarily for the benefit of the soil rather than for consumption or trade (cover cropping). By safeguarding this national carbon sink through these activities, Ya'axché's agro-forestry intervention enables the continued benefits of a vital natural asset that acts as a natural filter for both the air and watersheds, reduces flood risk and controls the climate through shade provision, among other ecological, research, heritage and scenic values. However, the conceptualization of this expansive agro-forestry initiative, which is enacted in a highly targeted and user-dependent fashion through experimentation and participatory learning, articulates no explicit macro-level political engagement beyond interfacing with the state for formal declaration and use of protected areas.

The Cohune Palm Nut Renewable Energy Project

On the other hand, the Cohune Palm Nut Renewable Energy Project is a highly technical mitigation intervention primarily aimed at tackling climate change by reducing dependence on

imported fossil fuel with a complementary livelihood enabling component. Specifically, it seeks to demonstrate the technological and socio-economic viability of producing fuels and food from naturally harvested (fallen) Cohune Palm Nuts, a renewable natural resource found in the tropical forest of Belize, which provided food to ancient Mayan civilisations.

The project is being implemented in Flowers Bank, the historic village from which the deciding votes were cast in 1797 to seal Belize's standing as Central America's only English-speaking nation. The small village, which rests on a narrow segment of the banks of the enormous Belize River, primarily depends on natural resources for its livelihood and on biomass fuels for household energy, particularly for the preparation of meals. These activities, the residents and their possessions are all susceptible to the impacts of climate change and variability. In addition to frequent flooding, which often maroons some villagers for extended periods, a major vulnerability of the community is their traditional approach to agriculture and subsistence farming, which depends on coordinating the start of rainy seasons, land preparation and planting. Improved climate modelling suggests significant changes in precipitation and weather events will make food production across communities like Flowers Bank less reliable and more food insecure. Accordingly, the project employed a community development framework and mobilized the village's sole institutional mechanism, the Flowers Bank Community Group, to launch an innovative pilot initiative for the commercial production of virgin cohune oil and cohune-based cosmetics to provide a livelihoods boon for the village. In so doing, the project tackles the community's climate-induced and/or exacerbated food security challenges through income generation.

Under the stewardship of the Flowers Bank Community Group, an organization with 13 members (mostly women - nine), what started as an inefficient manual survival effort has

morphed into an efficient mechanised system of producing cohune oil in commercial quantities that is improving the earning power of residents and revealing a novel approach to climate change. This mechanised intervention offers a critical safety net to the community. Only a few years ago, the nearby Williamson Clothing Factory, which employed more than 400 people (mostly women) closed, forcing many to return to what was long viewed as a difficult but stable income generating activity: cohune oil production and trading. The project is on the cusp of opening a five-tonnes-per day cohune nut processing facility owned and managed by the community that can produce virgin cohune oil for cosmetic products, high-quality meal and smokeless charcoal that conforms to American import standards. The community's cohune harvesting, and production activities complements ongoing data gathering for a national scale project on climate change resilience building through sustainable fuel alternatives. During the pilot phase, this included the demonstration and documentation of the economic, social and technological benefits and viability of producing fuel and food at commercial scale from naturally harvested cohune palm nuts in Flowers Bank. The data collected is being used to support the deployment of cohune nut processing in areas with adequate cohune population to support a five-tonnes-per day or greater processing facility.

While both climate change interventions are distinct in scope, primary sectoral focus, programmatic design and implementation, they feature varying but significant levels of community level engagement that accords them a degree of endogenous responsiveness. Specifically, both interventions evolved from locally conceptualized and enacted actions, such as the planting of cocoa in the Ya'axché villages and the livelihoods component of the Cohune Palm Nut Project. So, both projects channeled external support along clearly articulated and practiced dimensions for the expansion of endogenous actions and interests. The targeted and

beneficiary dependent experimental engagement approach used in the Ya'axché intervention, which is distinct from the population level engagement employed for the complementary livelihoods and renewable energy Cohune Palm Nut Project, is significant and warrants probing to determine the efficacy of these divergent engagement modalities for the scaling of pre-defined and enacted community adaptive actions. Clear distinctions in the political consciousness and ambition of the projects conceptually is also of heightened analytical importance. Whereas the Ya'axché intervention lacks manifest political consciousness, the Cohune Palm Nut Project is conceptually emblematic of the scale of the response demanded by the frontally political and transformative climate justice narrative distilled in the theoretical outlined. So, multi-level probing of the complementary livelihoods and systemic focus of the Cohune Palm Nut Project, which seeks to ameliorate and tackle the primary cause of climate change and variability, respectively, provides a rare prism through which to observe the enactment of complex responses crucial for enabling socio-cultural and economic adaptive capacity sufficient for the realization of new possibilities.

Belief Progression and Project Perception

Table 45: The level and nature of belief progression across study sites in Belize

Subset	Village	Mixed - 1		Positive 1		Density
		Prev	Rate	Prev	Rate	
Ya'axché	Indian Creek	4	20%	16	80%	20
	San Miguel	0	0%	3	100%	3
	Trio	1	5%	19	95%	20
CCCCC	Flowers Bank	0	0%	17	100%	17
Totals		5	8%	55	92%	60

Consistent with the endogenous genesis of both interventions, belief progression for both village subsets is positive (see Excerpts 48 and 56). This endogenous character also structures an overwhelmingly positive perception of the scaled initiatives (92 percent prevalence), which holds true across all villages, accounting for the entirety of project perception in both Flowers Bank

and San Miguel, 95 percent in Trio and 85 percent in Indian Creek (see Table 45). While positivity accounts for the entirety of project perception in both Flowers Bank and San Miguel, overall population disposition towards the scaled intervention offered by Ya'axché is attenuated by mixed perceptions with prevalence, averaging eight percent in the villages of Trio (five percent) and Indian Creek (15 percent). On closer examination, it is evident that mixed project perception observed in these two contexts is primarily (80 percent) accounted for by distinct groups: two cohorts in Indian Creek (young women - 60 percent and older men - 20 percent) and older men from the Trio cocoa group (20 percent).

It is important to note that both sets of men who register prevalence for mixed perception are directly engaged and their identical level of mixed-perceptual disposition is also complemented by similar levels of positive project perception (20 percent in Indian Creek and 17 percent in Trio). This similarity in perceptual disposition of the Ya'axché led scaled agro-forestry project among directly engaged cohorts in two of three villages studied suggests the nature and quality of project engagement has a significant impact on its resonance and impact (see Excerpt 46, Dialogue A - Respondent 4 and B - Respondent 2). This observation is also reinforced by the fact that contestations about engagement practices, particularly a failure to follow through on promises and engagement with the relatively privileged (landed and motivated), structures the entirety of mixed perception among young women in Indian Creek, who are tangentially engaged for the provision of catering services because of their proximity to Ya'axché's field station, which gives them distinct insight into the operationalization of the project (see Excerpt 47).

The engagement thesis is further underscored by the perceptual disposition of other cohorts that are primarily engaged indirectly. Overall, older women and young men have

uniformly positive perceptions of the project, while their counterparts (older men and young women) have textured (positive and mixed) perceptions of the project. However, for young women, this is entirely accounted for by those in Indian Creek. Elsewhere, the young women cohort has uniformly positive perceptions of the project. It is also instructive to note that even in Indian Creek, where young women have textured views of the project perception, it is equally split between mixed and positive (50 percent each). So, apart from the directly engaged subsets of older men and the young women of Indian Creek, all cohorts have uniformly positive perceptions of the project.

However, older women in Indian Creek and San Miguel from the Ya'axché subset and young men in Flowers Bank from the CCCCC subset registered no prevalence on any measure. This suggests no engagement or connection with the climate change project intervention. Taken alongside the significantly lower positive perceptual dispositions of the directly engaged for the Ya'axché intervention compared to the indirectly and unengaged, strongly suggests challenges with the nature and efficacy of the engagement modalities employed by both scaled versions of the endogenous climate actions. This necessitates an assessment of perceived personal inclusion and influence to determine the inclusiveness of these scaled-up versions of endogenous climate adaptation responses, and further contextualizes project proception, including the attrition in positive disposition among those directly engaged. It also offers a basis for understanding the affordances and limits of these interventions for boosting climate knowledge, agency, motive, action and leadership consummate with the prevailing challenges across these contexts.

Excerpt 46: The nature and quality of project engagement impacts its resonance (positive).

Dialogue A: Older Men Cocoa Group Focus Group – Trio, Ya'axché Subset	**Dialogue B: Older Men Focus Group - Indian Creek, Ya'axché Subset**
Interviewer: Is Ya'axché doing a good job? Yes, or no. Respondent 1, 2 & 3: Yes. Respondent 4: Sometimes it is good but sometimes they are late on listening to us. Respondent 5: Well, Ya'axché have been an essential part, so I think they are doing a great job and I know for a fact that this is just	Interviewer: Do you participate in that? Respondents 1, 2, 3: Yes. Respondent 4: No. Respondent 5: Yes, but not with cocoa with Inga. Interviewer: Do you think Ya'axché is doing a good job? Respondent 1: Yes.

the beginning and they will be with us during the entire process and the climate change is one of our topics. They mentioned that we are cultivating our self of being fully aware. So, yes, Ya'axché is excellent performing when they are spreading the knowledge. Respondent 6: Ya'axché is doing well.	Respondent 2: Yes, because they are training the people. But the thing that Ya'axché needs to do… I think they need to involve all the communities to have a training because it is not only four or five people have farm; all the communities have the farm. So, I think that is the way Ya'axché need to do it. All the village or whosoever they are training.

Excerpt 47: The nature and quality of project engagement impacts its resonance (mixed).

Young Women Focus Group - Indian Creek, Ya'axché Subset
Interviewer: Do you think Ya'axché is doing a good job? Why? Respondent 1: They are doing good most of the time, […] but in most cases they would go to people and they would say we will be doing this, we will be helping you and sometimes they don't and they would go […]. Maybe I would say that I would prefer they [help] somebody that [is] really [in] need, but I am not sure. But I am just saying maybe they will go to people that have better life. I would advise that they go to somebody else that is really in need. Respondent 2: Yes, because in some part they do something good. Yes, but in each women's group they give catering and they bring people from other country, like you [are a] visitor, to see our craft those are some that Ya'axché is doing good.

Personal Inclusion/Influence

Table 46: The relative nature of perception of personal inclusion and influence in each study site in Belize

Subset	Village	Mixed - 2		Positive 2		Youth Consultation		Density
		Prev	Rate	Prev	Rate	Prev	Rate	
Ya'axché	Indian Creek	2	14%	12	86%	0	0%	14
	San Miguel	0	0%	2	100%	0	0%	2
	Trio	3	16%	16	84%	0	0%	19
CCCCC	Flowers Bank	1	17%	4	67%	1	17%	6
Totals		6	15%	34	83%	1	2%	41

Three of five analytical units denoting perceptions of personal inclusion and influence over the interventions are varyingly active in the overall dataset: three in Flowers Bank and two in the Ya'axché subset (see Table 46). Overall, the projects are perceived to be inclusive, with positive perceptions of personal inclusion and influence over their implementation accounting for 83 percent of relative prevalence. Mixed perceptions (15 percent) and a desire for youth consultation (two percent) account for the remaining prevalence. However, consistent with the variation with which perception markers register across study populations, youth consultation is only evident in the Flowers Bank subset accounting for just eight percent of relative prevalence. This is consistent with the absence of any form of youth-specific groups in the community (see Excerpt 71), which is distinct relative to the other villages in the dataset where at least informal activity groups thrive. Mixed perceptions also account for the level of relative prevalence for

perceived personal inclusion and influence. The fact that the project itself is viewed positively (maximal level of positive prevalence) in Flowers Bank but a statistically significant segment of the population has mixed views about their personal influence/inclusion over the climate intervention is indicative of the study population's ability to compartmentalize and assess the scaling up of a locally determined climate and livelihoods action, and the means and processes by which the expansion occurs. This compartmentalization comports with observations by Kabeer (1994) about the high import of the kinds of information (scientific, positivist, external or local and experiential) and knowers (neutral and detached or committed and involved) privileged in development interventions.

The implication is that engagement modalities are central structuring factors for perception and efficacy of climate interventions even where its genesis is endogenous. Specifically, where it is or perceived to be insufficient, it undermines both perception and critical elements necessary for enabling climate action (namely, knowledge and motive). This is underscored by similar levels of positive and mixed perception of personal influence and inclusion over the implementation and management of the intervention in Flowers Bank and all villages in the Ya'axché subset, except San Miguel where positive views account for the entirety of the prevalence. Specifically, positive perception accounts for 83 percent of relative prevalence in Flowers Bank, 84 percent in Trio and 86 percent in Indian Creek and mixed perception accounts for 15 percent, 16 percent and 14 percent, respectively. The distinctions in perception of the project and personal inclusion and influence in both Indian Creek and Trio support the observation of the structuring effect of engagement modalities across contexts and groups.

While Indian Creek, particularly young women in the locality, registered a high degree of mixed perception in terms of their views of the project, the village registered less prevalence for

mixed perception in terms of personal inclusion/influence (14 percent compared to a quarter) and young women in the locality felt entirely included. This suggests direct exposure to the project intervention may have undermined/attenuated their reception to its proclaimed benefits and intents, particularly their perception of how and whether promised benefits are dispensed, per Excerpt 47 (Excerpt 48 from Flowers Bank offers reinforcement for this observation). Conversely, older men in Indian Creek and younger men in Trio, who accounted for marginal or no prevalence for mixed perception of the project in the localities, respectively, show a higher level of mixed perception regarding their personal inclusion/influence over the project (a quarter (one of four) to 100 percent (two of two) and none (zero of one) to two-third (two of three), respectively). This suggests both the nature of the activities through which the study population is directly engaged and the nature and scope of their engagement (some or none) strongly correlate with overall perception of influence and views of even locally conceptualized projects when scaled. A cohort level examination of the data supports this observation.

Overall, all cohorts have positive perceptions of their personal influence/inclusion except three discrete cohorts: older men in Indian Creek, young men in Trio and young women in Flowers Bank. Mixed perceptions account for two-thirds (two of three) of prevalence in each of the first two instances and perception is equally distributed across positive, mixed and a desire for youth engagement in the latter (a third or one of three each). Overall, older women feel the most included with positive perceptions of personal influence/inclusion accounting for the entirety of prevalence for this measure, while young men feel the least included (six of eight or three-quarters). Young women and older men show comparable levels of perceived inclusion/influence (83 percent and 81 percent, respectively). So, while the overall picture suggests women feel more included, a more granular examination reveals a less direct/significant

association between gender and perceived inclusion and influence with discernable contextual differences that comports with variations engagement across villages and cohorts under both interventions.

Despite population-level engagement in Flowers Bank, for instance, older residents are more involved with different aspects of the intervention than youth. Mature women primarily manage and staff the cohune nut processing facility, while some older men were engaged in its construction, as well as ongoing interface with the external institutional supporter, the CCCCC, during the data collection process and manual work related to the complementary renewable energy pilot. This distinct age-bias in population engagement in Flowers Bank is consistent with younger cohorts, particularly young women, accounting for the totality of mixed perception regarding personal influence and inclusion for the village and the totality of expressed concern about a lack of youth consultation, as well as the lack of any youth structure in the village (see Excerpt 71).

On the other hand, the villages in the Ya'axché subset varyingly benefit from targeted and sustained engagement based on expressed interest and engagement in agro-forestry and related conservation activities (see Excerpt 49). So, although the dominant engagement modality disposes itself to greater engagement with men engaged in agro-forestry, the scope and extent of engagement varies across localities and in some contexts contextual differences allow for distinct cohort engagement patterns in specific localities, such as the direct engagement of young women in Trio in beekeeping as a climate-sensitive conservation and livelihoods activity (See Excerpt 57). Distinctions in engagement patterns are also evident among older women in San Miguel and young men in Flowers Bank, who registered no prevalence on any of the two measures under

consideration. This suggests no engagement or connection with the climate change project intervention.

These distinctions in engagement patterns, which structure project perception across cohorts and villages associated with both climate interventions, are highly significant as they are likely to also impact climate knowledge. This warrants an examination of climate knowledge, which is central for action and change (Bord, Fisher, & O'Connor, 1997; Dutta, 2011; Freire, 1970, 1973; Grotzer & Lincoln), across both village subsets to ascertain the extent to which the engagement modalities have structured them. An examination of climate knowledge in these contexts is also likely to offer insights necessary for contextualizing the efficacy of current action, improving existing and informing new pathways for action consummate with the climate change induced impacts being experienced and projected. Specifically, it offers a basis for understanding and mobilizing the relationships between cause identification, climate perception and risk, as well as motive, and agency that must underpin effective response mechanisms.

Excerpt 48: Mixed perception of influence and inclusion over the formalization of a traditional practice.

Young Women Focus Group – Flowers Bank, CCCCC Subset
Interviewer: […] Do you think the Cohune palm project is a good project? Respondent 3: Yes. Interviewer: Why would you say that? Respondent 3: We have something that has been traditional throughout our community and have been carried on generation from generation and with them being able to find a[n] easier way to do it; nonetheless that, back in the day it was so hard. And they did not give up. New intervention and machine helping them to do it and we have the produce in abundance. I think it's a good project. Interviewer: Yeah. And you think the 5Cs is doing a good job? Respondent 3: In? Interviewer: In supporting. Respondent 3: Well, for me when they were working on…because they had build a portion of the project; we had initially got the building and some reason I think that they had lacked in terms of the execution of that portion. Because when we had gotten that project before... We had lobbied to get a vehicle and we saw a vehicle…We thought it would have been for us at the end of the project, but they did not give it to us. So, transportation is one of the issues in terms of getting the nuts from further communities rather than right here, locally. Because we do get it from outside sources. Interviewer: Do you think… If you tried to make suggestions to them, would they listen? Respondent 3: Well, nothing beat a trial but a failure. So! Interviewer: Have they been receptive to community's feedback? Respondent 3: Not really, but in terms of when we have express[ed] our concern about the transportation, and that was the initial reason we had purchase[d] the vehicle and knowing the size of the vehicle they got… but since then we haven't heard anything. And that's one of the contributing factors in limiting [us].

Excerpt 49: Ya'axché's comprehensive focused and sustained engagement is variably available and accessed.

Older Men Focus Group – Indian Creek
Interviewer: Are you all involved with Ya'axché? Respondent 1: To me, I start to work with Ya'axché in cocoa farm[ing]. Before, what Ya'axché used to do is just select who all who is [sic] willing to do farming in the farm, so that is the first thing Ya'axché used to do before. So, who all willing to participate in that. Interviewer: Do you participate in that? Respondents 1, 2 & 3: Yes. Respondent 4: No. Respondent 5: Yes, but not with cocoa; with Inga. Interviewer: Do you think Ya'axché is doing a good job? Respondent 1: Yes. Respondent 2: Yes, because they are training the people. But this, the thing that Ya'axché need to do, I think they need to involve all the communities to have a training because it is not only four or five people have farm. All the communities have the farm, so I think that is the way Ya'axché need to do. I[nvolve] all the village or who so ever they are training. Respondent 3: Well, in my case, yes; they are doing a very good job because they promote any opportunity for the farmers. They give opportunity for any training or anything what the person like to do, too. Like, for example, he [pointing at Respondent 5] is just doing Inga, all the cropping and this one [pointing at respondent 2] is doing other farming and more of us are doing some cocoa farming. But, Ya'axché is the one who give us the knowledge and the opportunity to learn about those things because, before, myself, I doesn't [sic] know about farming but since I adapt myself to farming with Ya'axché, so I start to come up with my idea. Also, they have to put their input and I also have to put my input so that we work together. Respondent 4: Oh, yes, they are doing a good job. They are promoting farmers and not only with cocoa [and] Inga, with other things. Just last month, Mr. [Respondent 3's name redacted] said he went [on an] exchange visiting trip to Cuba to see other farmers [and] what they are doing. So, they took some farmers to take a look, to [learn what] other farmers, what they are doing. Respondent 5: Well, maybe it is good if they are helping like one of my child [sic] started [referencing a scholarship]. They were helping. It is good when I see they [sic] help. Interviewer: If you had suggestions would Ya'axché listen to you? Respondent 1: Well, in my case, yes, they do! But, they don't do it right away. They take time because remember they have to monitor things and put things together. So maybe we already forget about it, so when […] they come and put the idea about it, but they do listen. Respondent 2: Yes. Respondent 3: Well as I said I am just new to this. I will not say yes or no because am just new. Just last year we went to Honduras and there is where I started. November last year [2017, three months prior to the interview date]. I will not complain. Just [last] month they took me to Cuba.

Climate Knowledge

Table 47: The nature and relative strength of various forms of detectable indicators of climate knowledge in Belize

Subset	**Village**	**A Posteriori**		**Experiential**		**Knowledge Gap**		**Density**
		Prev	**Rate**	**Prev**	**Rate**	**Prev**	**Rate**	
Ya'axché	Indian Creek	9	28%	4	13%	19	59%	32
	San Miguel	2	12%	0	0%	15	88%	17
	Trio	23	66%	3	9%	9	26%	35
CCCCC	Flowers Bank	10	71%	0	0%	4	29%	14
Totals		44	45%	7	7%	47	48%	98

Three of the five codes denoting knowledge are varyingly active in the dataset: Two in Flowers Bank and San Miguel and three in Indian Creek and Trio (see Table 47). Overall, knowledge gaps account for the greatest degree of prevalence (50 percent). However, it is only the dominant indicator of knowledge in San Miguel (88 percent) and Indian Creek (59 percent).

In Trio and Flowers Bank, knowledge gaps account for a quarter and 29 percent of the prevalence associated with knowledge, respectively. It is a posteriori or premium knowledge that accounts for the majority of prevalence in both contexts with similar levels of resonance (66 percent and 71 percent, respectively). Excerpt 21 and 28 illustrate the operationalization of a posteriori knowledge in Trio and Flowers Bank, respectively, where it is greatest. Conversely, a posteriori knowledge or premium climate knowledge is lowest in San Miguel (12 percent), which is marked by low overall ideational exposure to climate change information but exhibits explicitly positive climate change agency.

While a posteriori knowledge is also low in Indian Creek, it is more than twice the level in San Miguel, accounting for 28 percent of prevalence for knowledge. Indian Creek is also distinct in that it is one of only two villages where experiential knowledge (13 percent)—partly guided by project intervention—structures knowledge patterns, which improves the overall knowledge profile of the village (41 percent in Indian Creek compared to 28 percent in Trio). The experiential knowledge unit of analysis is significant in that it only registers in the two villages from the Ya'axché subset (Trio and Indian Creek) where segments of the population are directly engaged in practical climate change demonstration activities, which includes the provision of climate information, guidance/training and tangible resources. Further, both villages account for similar levels of prevalence for experiential knowledge overall (three of seven and four of seven, respectively) and comparable levels of resonance at the village level (nine percent compared to 13 percent, respectively).

The implication is that there is likely a positive relationship between direct project engagement (chiefly, formal or structured), experiential knowledge (informal) and the development of accurate and/or substantial climate knowledge (a posteriori or premium). Excerpt

50 illustrates the possibility of this structuring relationship between the manifestly credible information provided by projects and experiential knowledge. The implication is that the limits and incapacitation of traditional knowledge, both as an independent and legitimate knowledge form (Adugna, 1996; Argawal, 1996; Reichel, 1993) and in relation to the unprecedented environmental change and variability (Showers, 1996; Zwahlen, 1996), may be attenuated by substantial, focused and targeted information provision. This is underscored by substantial concerns about the failure of agricultural techniques and practices that have been cultivated and effectively deployed for centuries, which puts those who are change averse or slow to change at an existential disadvantage (see Excerpts 51 and 60).

Excerpt 50: Project intervention positively structures experiential knowledge.

Older Men Cocoa Group Focus Group – Trio, Ya'axché Subset
Interviewer: Have you ever heard of the term climate change? Respondent 1: Well for me I have heard about it. I don't know how to say that [estimating the point of learning]. From a long time ago, I plant tomato, cabbage, watermelon, but from then I start to plant cocoa [and] now there is a problem. Long time ago when I started to plant tomato, cabbage there was not a lot of animals but when I try [to] plant a little bit now, a lot of animals, lot of sickness, and I noticed that sometimes it's? and then it's rainy and with the roots it's like it's cook?? when a lot of sun now and […] before it wasn't like this. Respondent 2 & 3: Yes. Respondent 4: Yes. I heard about climate change. Interviewer: Where exactly did you hear about climate change? Respondent 1: Well, I heard from when I started to plant cocoa and that was when I started [to] know about how to use the chemical not like before I didn't know about it but now started to hear how to use the chemicals and at the church. Respondent 2: Well, I have get (sic) to hear about it when we actually come as a group, as a cocoa group we have been attending a lot off training that is where I heard about it and […] in what I've [been] learning right now, [it] is the kind of work we're doing [that] is taking care of the land, the soil, you know, because before people just fall and burn the place. They use pesticides. So, I think there is where I am learning the big change right now, not using fire or chemicals. I mean there is what I learn [that] the change [in] the nature from before and what I am learning in my cocoa, it is really a good working. I am not using burning. I am not using chemicals.

Excerpt 51: Project intervention attenuates limits and incapacitations in traditional knowledge

Older Men Focus Group - Indian Creek, Ya'axché Subset
Interviewer: Where did you first hear of climate change? Respondent 1: Well, sometimes I attend a workshop, I forgot what the project name, but I went to attend a workshop. Respondent 2: Well, me too. I can't recall which project mentioned about those climate change, but I know I have heard it. I have heard more or less. Respondent 3: Well, me, when I hear about climate change [was] with the project with Ya'axché conservation. That is the one that come up with this climate change system, we doesn't (sic) know, but right now we are experiencing that. It is changing because you could see the weather right now. It is not supposed to be flood[ing], rainy; it is supposed to be dry season right now. We have followed that it is true that the climate is changing. Respondent 4: When I heard about it, we are getting to hear about it through Ya'axché conservation trust. They say we are having climate change now. Respondent 5: Like how he [pointing at respondent three] said when the times comes for sunny and when it is time [to plant], no more rain. Interviewer: So, when you hear climate change, what does it mean to you? Is there anything different about now that is different from back in the days? Respondent 1: That the weather changes when it is sunny season or rainy season, but sometimes it changes and sometimes it is not the time when it is supposed to be.

Respondent 2: What climate change means to me that nowadays, as you see, and as I was growing up when it is time for dry season it is time for dry season and now it is like it is mixed up with the rain and dry. So, you know that our crops is not coming up good; that sometimes rain and dry.
Respondent 3: Well in my case or in my part, I know this is especially with the farm when coming to do the farm with the climate change for like how it stand [over the] last two years. The cocoa we produce, it in time like this season we already start to harvest the cocoa, but right now [late January 2018] we are not harvesting cocoa maybe till ending of March. That is the way how I noticed that this is climate change because before there was no 'lot a cold' like this for this area. That is a climate change for me or for the plants, for the people, you know; especially the cocoa right now. It is not producing due to the climate change right now. It got… especially, this month that just went, it is too much cold and it is affecting the plants. I think that is climate change that we are facing.

However, varied combinations of age and gender correlates with knowledge levels, which is consistent with the male bias embedded in a targeted and sustained intervention because of its focus on a primarily male domain (farming and agro-forestry activities) in the contexts where the Ya'axché intervention is underway. This is exemplified by the fact that older women, who consistently show lower ideational levels, are the only cohort for which knowledge gaps account for the majority of prevalence associated with knowledge levels (nearly three-quarters, compared to 50 percent for young men, 48 percent for young women and 30 percent for older men). This is most pronounced among older women in Indian Creek and San Miguel where knowledge gap is most intractable (accounting for 85 percent and 75 percent of each cohort's prevalence for knowledge, respectively). The knowledge gaps observed among women in these localities are consistent with discernible marginalization or disengagement under the existing targeted and selective climate intervention modalities underway in their villages. As Excerpt 49 suggests, women in Indian Creek are tangentially engaged for service provision to Ya'axché (catering and ancillary work), which gives them some exposure by virtue of proximity and women in San Miguel are entirely disengaged such that all women in the sample population in the area report no familiarity with the term climate change—specifically, no recollection of hearing the term or being informed about its impacts.

However, older women in Trio show no knowledge gap and their counterparts in Flowers Bank only record a third (one in three). While there is no discernible evidence of direct

engagement, older women in Trio are distinctly more knowledgeable than their counterparts in the Ya'axché subset because of knowledge transfer due to the longer duration of the sustained, focused and targeted agro-forestry intervention underway in their community. This suggests that over time, even limited population level engagement accrues significant impact, which is consistent with the advantages of ecological models of behaviour change that privileges both people and place-based drivers of behaviour (Maibach, Roser-Renouf & Leiserowitz, 2008). Specifically, by engaging practitioners (farmers) in a domain (farming) of high import to all to resolve discernible challenges over a sustained period, Ya'axché's resonant intervention frame accrued population wide knowledge advantages. Considering the limited scale of the intervention because of its resource-intensive and targeted nature, time is a consequential factor for the positive knowledge transference noted. This means the emphasis on scale in ecological approaches should be considered against time in forecasting the success of activities with sub-maximal intervention levels.

The comparable level of knowledge gap among older women from Flowers Bank with men overall means the age and gendered climate knowledge disadvantage associated with older women obtains in the Ya'axché subset rather than the population level intervention supported by the CCCCC through a largely female-led community institution in Flowers Bank. More broadly, a posteriori knowledge accounts for near identical levels of prevalence for all other groups: 52 percent each for young women and older men and 50 percent for young men. Consistent with the observation that experiential knowledge is driven by ideational exposure and age acting in concert, older folks, primarily older men from Trio and Indian Creek (85 percent), account for the entirety of prevalence associated with experiential knowledge. The likely implication is that, what Cornwall (2002) calls the micro-politics of participation and engagement, which is

substantially structured by the in-built male inclusion bias of Ya'axché's gendered domain engagement modality, is also subject to equally consequential structuring factors that are likely associated with situated practices, including media access and use.

Given distinctions in engagement patterns, particularly in the Ya'axché subset, there is need to probe climate knowledge acquisition sources to better understand how climate knowledge is being structured. This will aid in understanding why every cohort, except all older women in the subset besides those in Trio, exhibit highly similar levels of premium climate knowledge. Such a probe will also illuminate the climate knowledge distinctions noted among older women, specifically why those in both Trio and Flowers Bank do not exhibit the intractable levels of knowledge gaps and low a posteriori or premium climate knowledge observed in San Miguel and Indian Creek.

Climate Change Knowledge Acquisition

Table 48: The relative prevalence of initial sources of climate knowledge in Belize

Subset	Village	Catholic Church		Extreme Event		Friends/ Peers/ Relatives		News		Observation		Project Intervention		School		Village Meeting		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Ya'axché	Indian Creek	0	0%	0	0%	0	0%	0	0%	3	16%	5	26%	11	58%	0	0%	19
	San Miguel	0	0%	0	0%	2	50%	1	25%	1	25%	0	0%	0	0%	0	0%	4
	Trio	1	6%	0	0%	1	6%	2	13%	2	13%	4	25%	5	31%	1	6%	16
CCCCC	Flowers Bank	0	0%	1	2%	8	14%	13	22%	6	10%	9	15%	20	34%	1	2%	59
Totals		1	2%	1	2%	8	14%	13	22%	6	10%	9	15%	20	34%	1	2%	59

Per Table 48, eight of the 10 codes indicating initial source of climate change knowledge acquisition are active in the overall dataset in varying fashion across villages (seven in Trio, four in Flowers Bank and three in Indian Creek and San Miguel each). Overall, the three most manifestly credible sources of climate knowledge evident in the dataset are the most grounded or dominant: school at more than a third (34 percent), news at more than a fifth (22 percent) and project intervention at 15 percent relative prevalence. However, informal sources such as the grapevine (denoted by friends/peers/relatives) and observation each account for more than a

tenth of prevalence: 14 percent and 10 percent, respectively, with varying resonance across localities.

In San Miguel, which is the only village where manifestly credible sources of initial knowledge acquisition do not account for the greater prevalence, the grapevine (Friends/Peers/Relatives) accounts for a half of the prevalence of all codes denoting initial source of climate change knowledge acquisition for the village and observation accounts for the same level of prevalence as news (one each or 25 percent each). This strongly correlates with conventional wisdom that older folks, who constitute the totality of the sample population for the village, tend to rely on traditional networks, practices and knowledge to make sense of the world. This is also supported by the data that shows that young people, specifically young men in Flowers Bank, only registered a single instance of prevalence for the grapevine (one of eight) and zero for observation. The high dependence on the grapevine and observation (75 percent of relative prevalence) as sources of climate knowledge in San Miguel, amidst a paucity of manifestly credible sources of climate knowledge, comports with the village's distinction as having the highest level of knowledge gap in the entire dataset (88 percent).

The connection between a lack of manifestly credible sources of climate knowledge and knowledge gaps in San Miguel is underscored by the weakness of the available information networks and general knowledge seeking disposition of the population, as illustrated by Excerpt 52. It also highlights the fact that although indigenous knowledge, amenable through observation and sustained practice, is elemental to sustainable practices, it has limitations. However, these limitations are not confined to technical or capacity/utility exhaustion, as highlighted by Adugna (1996), Argawal (1996), Dore and Nogueira (1994), Showers (1996) and Zwahlen (1996), who point to the scale of contemporary environmental challenges, but even ideational gaps and

incapacitations that must be taken as a starting point for action and other forms of knowledge operationalization.

Excerpt 52: A lack of manifestly credible climate sources results in dependence on weak information networks.

Older Men Focus Group– San Miguel, Ya'axché Subset
Interviewer: Where did you hear about it last year?
Respondents 3: I have a brother who work[s] in government, who [is working on a] development in Belmopan right now. He talk[s] about it; he is from the government. Maybe they have meeting, so he come to me to tell the rest of the brothers that climate changes, it [sic] already coming. Maybe too much dry or too much rain. I don't know what it brings, so last year I get to hear it before. I don't hear about it.
Interviewer: I understand. So, would you like to learn more about climate change?
Respondents 1: Yeah, I want to know what would be next for the climate.
Interviewer: And where did you first hear about climate change?
Respondents 1: Well, actually, we are working up the hydro-mile, right in our group [and] we take a break and we discuss about it and we talk about it and I think they see it on internet with the weather and from there I find out.
Interviewer: What group are you working in? What is a hydro-mile?
Respondents 1: Hydro-mile, it [is] just a part time job. It is a company that produce electricity.

In all other villages, which exhibit at least twice as much prevalence for premium climate knowledge as San Miguel, manifestly credible sources of climate knowledge account for at least two-thirds of the relative prevalence for climate change knowledge acquisition, specifically: 84 percent in Indian Creek (26 percent and 58 percent for project intervention and school, respectively); 70 percent in Flowers Bank (50 percent and 20 percent for news and school, respectively) and 69 percent in Trio, the village with the widest array of active codes (31 percent, 25 percent and 13 percent for school, project intervention and news, respectively).

School, which is the single most grounded indicator, only ranks first in Indian Creek and Trio as initial knowledge sources, while news, the second most grounded indicator overall, is only ranked first in Flowers Bank. Consistent with the contextual variation in initial sources of knowledge, project intervention, which is the third most grounded indicator, is only active in two villages (Indian Creek and Trio) and does not account for the majority of prevalence in any. In fact, it ranks second in both with identical levels of prevalence of 26 percent and 25 percent, respectively. It is significant that the project intervention does not figure as an initial source of

climate knowledge in Flowers Bank, the village with the highest level of premium climate knowledge, while it is equally operable in Indian Creek and Trio.

The similarity in the relatively low levels of knowledge gaps in both Trio and Flowers Bank (a quarter and 29 percent, respectively), as well as relatively high and comparable levels of premium climate knowledge (66 percent and 71 percent), suggest the nature of the climate knowledge acquisition sources is significant. Specifically, Trio, which has access to the widest tapestry of initial climate knowledge acquisition sources, has the lowest level of knowledge gaps in the dataset. However, Flowers Bank, which depends on initial climate knowledge acquisition modalities that are more enduring (news) and comprehensive (news and schooling) than a domain specific project-oriented information provision mechanism, has the highest level of premium climate knowledge and is only narrowly outstripped by Trio for having the lowest level of climate knowledge gaps.

Moreover, the primacy of news (chiefly radio and television in these localities) as a knowledge acquisition modality in Flowers Bank and its absence from the dataset for the Ya'axché subset further underscores the observation of the significance of the nature of manifestly credible climate acquisition sources, particularly their scope, frequency and accessibility. As established in the previous chapter, whereas the project intervention presents climate change with issue, context and domain specificity that narrows the scope of knowledge provided, news coverage of climate change as a translating process from scientific to public audiences (Boykoff & Boykoff, 2011) is current, more general and descriptive of a wider range of issues, domains and contexts.

So, information provision mechanisms function akin to multilevel and single-level interventions, where the former conforms with the more nascent ecologic view of effectively

enabling behaviour change. This observation is also supported by the fact that San Miguel, which exhibits the highest level of prevalence for manifestly credible sources of initial climate knowledge, is also the village with the second lowest level of climate knowledge and primarily cites a distal and past source that is no longer accessible (schools – 58 percent). The village so decisively relies on this initial source of knowledge that it accounts for more than twice their dependence on their only other current credible source, which is a domain specific modality (the project intervention at 26 percent).

There are also significant cohort-level distinctions across the localities in climate knowledge acquisition that further illuminates the climate knowledge distinctions observed. Overall, young people and older folks account for comparable levels of prevalence associated with manifestly credible sources of climate change knowledge acquisition (52 percent and 48 percent, respectively). However, the sources vary significantly. Young people account for just short of the totality (95 percent) of prevalence associated with school, which is consistent with the relatively recent introduction of climate change in the Belizean curriculum. Even the remaining prevalence is attributable to a male in the older cohort (Flowers Bank) who is on the younger end of the spectrum. Whereas, older folks account for more than three-quarters (77 percent) of the prevalence associated with news and the entirety of prevalence associated with project intervention.

While the overall data suggests men have vastly greater access to credible sources of information about climate change because they account for two-third of the prevalence associated with manifestly credible sources of information (28 of 42 – 12 for school, nine for project intervention and seven for news), a more granular look suggests a more durable age rather than gendered dynamic. Young women account for the same level of prevalence associated

with news as young men (15 percent each) and comparable levels for school (40 percent for young women compared to 55 percent for young men). In fact, it is older women who are most deprived of access to credible information: a mere tenth of prevalence for manifestly credible sources, all of which is associated with the older women of Flowers Bank. This reinforces the observation that access to manifestly credible climate knowledge acquisition sources that offer comprehensive information in a sustained fashion is more efficacious because older women in Flowers Bank do not exhibit the same intractable levels of knowledge gaps and low premium climate knowledge observed among their peers overall in the Ya'axché subset.

It further clarifies the heightened ideational disadvantages of older women overall that have been observed. Their narrow access to manifestly credible sources of climate knowledge contrasts with all other cohorts for whom credible knowledge acquisition sources account for at least two-and-a-half times as much relative prevalence: approximately one-third for older men (36 percent) and young men (31 percent) and a quarter for young women (24 percent). Older men also account for the entirety of prevalence associated with project intervention as a source of climate knowledge acquisition, which further underscores the observation that they have had a higher or more credible level of ideational exposure, which, as established in the subsequent section, is evidenced by the cohort accounting for a vastly greater portion of the prevalence for signs/indicators and a wider array of indicators.

As observed earlier, the knowledge deficit associated with older women is absent from Flowers Bank, which is the only village not included in the Ya'axché subset and was exposed to a different project, one that targeted a community in general and is largely managed by women. In this context, the data shows a more balanced distribution of prevalence associated with manifestly credible sources across cohorts: older women, young men and young women each

account for 21 percent of the prevalence for manifestly credible sources. So, while the overall knowledge deficit among older women offers very narrow support for the consensus in the extant literature that women often exhibit lower technical knowledge about environmental concerns—11 of 16 studies reviewed by Davidson and Freundenburg (1996), the operable factors are most likely situational (access, engagement and availability) rather than a lack of motive or a knowledge seeking disposition (see sub-sections on agency and motive) as implied by these findings.

Furthermore, while these situational factors manifest in knowledge distinctions that supports Tichenor, Donohue & Olien's (1970) knowledge gap hypothesis, in terms of information or knowledge advantages rather than economic, the consonance of the nature and scope of information provision modalities even when manifestly credible substantially delimits even more recent incarnations of this hypothesis (Boykoff, 2011; Yang & Ho,2017). Place of worship, village meeting and extreme events are the only other active codes denoting climate change knowledge acquisition sources in the overall dataset and they each register single instances of prevalence in circumscribed localities and groups: older men in Trio for the first two and older women from Flowers Bank for the third (extreme events).

A closer look at the nature and range of signs and indicators, a measure of climate knowledge and operationalization, strongly suggests that the climate knowledge distinctions observed are associated with the nature, scope, and duration of climate information provision and availability. Comparatively, the prevalence of signs and indicators of climate change in both villages is on par with what is observed in the Fijian villages with weaker climate ideational exposure, and the Indian dataset, which is also marked by ideational deficits.

Signs and Indicators

Table 49: The relative prevalence of signs and indicators of climate change in Belize

Subset	Village	Weather		Crop Yield/Soil Health		Fish Stock		Forest Fires		Health		Pollution		Soil Erosion		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Ya'axché	Indian Creek	17	61%	6	21%	0	0%	0	0%	0	0%	5	18%	0	0%	28
	San Miguel	4	50%	1	13%	0	0%	0	0%	3	38%	0	0%	0	0%	8
	Trio	18	32%	15	27%	4	7%	1	2%	8	14%	10	18%	0	0%	56
CCCCC	Flowers Bank	15	56%	6	22%	0	0%	0	0%	1	4%	2	7%	3	11%	27
Totals		54	45%	28	24%	4	3%	1	1%	12	10%	17	14%	3	3%	119

Nearly 80 percent of the total prevalence (65) associated with signs and indicators is accounted for by the larger Ya'axché subset. However, only seven of the 13 codes denoting signs and indicators are varyingly evident in the overall dataset. Per Table 49, they are: Weather (54), Crop Yield/Soil Health (28), Pollution (17), Health (12), Fish Stock (four), Soil erosion (three) and Forest Fires (one). The primarily agricultural lens through which concerns about weather changes are expressed, alongside pronounced concerns about crop yield/soil health and notable references to fish stock underscores a primarily food security climate change perceptual frame. Excerpt 53 typifies the food security frame. The consistency with which both weather and crop yield/soil health feature as chief perceptual markers of climate change and variability across all localities underscores this observation. This means food security is a critical frame for the enactment of efforts to optimize climate knowledge and enable action in these contexts.

Excerpt 53: Climate Change is perceived through a strong food security frame.

Older Men Focus Group – Flowers Bank, CCCCC Subset
Interviewer: Have you ever heard the term climate change? Respondent 1: […] Especially in the weather pattern. Because… in the past, we use to depend on the weather; especially the rainfall to take care [of] some of the crop[s]. Like this year right here…usually in December [or] January, you get reasonable amount of rain that would keep the soil moist and…and this year, here, it hadn't (sic) rain for almost a mouth. It got so dry that…it affects the crop, which is unusual. So that is what I call like the climate change. You can't…the weather pattern is not like before…that you know that rain would come January [or] February…and then it start[s] deteriorate. And then you go in into March and you go into May and then it gets dry…and then it maybe it starts to rain June [or] July…But um… you can't depend on that anymore. Because when you look…when you were hoping to see dry its rain and when you look when you hope you would see dry that is when it brings rain. […] Interviewer: What about you? Have you heard of the term "Climate Change"? Respondent 2: Oh yeah! Its… It's like a buzz word now. Interviewer: Aha? Respondent 2: Yes! […] I have noticed the changes in weather pattern. Like for instance, we use to do milpa farming. Right, so, January, late January onto early February you would start cutting down the forest to make your milpa…you and then, you would burn in May and so on, get ready for the rain in the end of May [to] early June. But that has changed now. The…you can maybe cut milpa the whole year round because you get a small amount of rain and then like you get more dry (sic), dry season than rainy season. And, so, like people who are

farming now, have to adjust themselves or you have to be depending on maybe have some kind of water source because you can't really be dependent on the weather like before. So, these are some of things that we notice about the weather. And we out here try to study the weather a lot right…so we can adjust ourselves to suit the weather… so that we can grow our crops…and you know?
Interviewer: What's "milpa Farming"?
Respondent 2: That's like, we…we'd call it plantation! You'll plant your rice, your cocoa, your plantain. Everything.
Interviewer: Oh…Multi-cropping? [But slash and burn is done in preparation].
Respondent 2: Right.

Weather, pollution and crop yield account for the top three most grounded signs and indicators of climate change across all villages in both subsets, except San Miguel where the sample population is distinct: older folks who rank weather, health and crop yield as their primary sign/indicators of climate change (50 percent, 38 percent prevalence and 13 percent, respectively). So significant an indicator/sign of climate change is weather among the study population, which depends on rainfed agriculture, that it accounts for at least half of the prevalence for the code in all villages (60 percent in Indian Creek, 56 percent in Flowers Bank and 50 percent in San Miguel), except Trio. In Trio, weather accounts for approximately a third of relative prevalence, alongside the broadest array of signs/indicators across all villages (six of seven codes versus five in Flowers Bank and three each in San Miguel and Indian Creek). The broader array of signs/indicators in Trio suggests higher ideational exposure. This is consistent with the village's distinction for having the lowest knowledge gap, second highest level of premium climate knowledge and widest array of manifestly credible initial sources of climate knowledge acquisition. Furthermore, even though some signs are contextual, as noted below, the totality of signs associated with each locality from highest to lowest correlates directly with each village's rank in terms of knowledge gaps (lowest to highest).

So, Flowers Bank, which ranks second to Trio in terms of the number of signs/indicators perceived, also ranks second to Trio for having lower levels of knowledge gaps. As observed in the previous subsection, Flowers Bank also primarily depends on news, a current and readily accessible source of manifestly credible climate change information that generally spans a range

of domains. Conversely, San Miguel and Indian Creek, which have the highest levels of knowledge gaps (triple and double, respectively, the average for Trio and Flowers Bank) perceive the least range of signs/indicators, approximately half the range perceived in Trio and Flowers Bank. Both villages also have circumscribed access to manifestly credible sources of climate knowledge: an overwhelming dependence on a distal source that is no longer accessible (school) in Indian Creek and the absence of credible sources altogether in San Miguel. This strongly underscores the import of a quality factor (nature and scope) to be included in the knowledge gap hypothesis for it to be more relevant in understanding how information provision mechanisms are likely to structure climate knowledge and operationalization.

Crop yield/soil health, the second most grounded indicator/sign of climate change accounts for a more consistent level of prevalence than weather across villages, except San Miguel, as indicated above. This reinforces the primacy and consistency of the food security climate change perceptual frame in these contexts. The indicator accounts for more than a quarter (27 percent) of relative prevalence in Trio and more than a fifth in both Flowers Bank and Indian Creek (22 percent and 21 percent, respectively). Pollution, the third most grounded sign/indicator, varyingly grounded across villages due to contextual factors as illustrated by Excerpt 9. Pollution accounts for the same level of relative prevalence in the dataset for both Indian Creek and Trio (18 percent each), where the indiscriminate aerial spraying of pesticides by a neighbouring agro-industrial corporation is the focus of heightened community concern about health and safety. Elsewhere, pollution only accounts for seven percent in Flowers Bank and zero in San Miguel. Health, which rounds off the four most grounded signs/indicators in the dataset, varies from a high of 38 percent in San Miguel to 14 percent in Trio and a mere four in Flowers Bank and zero in Indian Creek.

While the high prevalence of health as a sign/indicator in San Miguel is likely a reflection of the sampling distinction (only older men and women) that highlights an older demographic's heightened susceptibility to maladies with age, explicitly contextual and knowledge factors account for health's significant relative prevalence in Trio. As Excerpt 55 shows, even amidst substantial climate knowledge limitations there is heightened concern about and direct linkage of climate change and increased diseases in the village. This comports with anticipated climate change-induced increases in vector borne disease, airborne allergens caused by higher concentrations of pollen and moulds (Taylor, Chen, Bailey, 2009). Airborne allergens can contain potentially infectious organisms and allergenic plant material which exacerbate asthma and allergies, especially for vulnerable members of the community. These impacts are already manifesting in Belize, with the spread of newly emerging vector-borne diseases such as chikungunya and the heightened prevalence of others such as malaria and dengue. Furthermore, the risks to food security and water quality observed in the dataset also have manifest health implications of a heightened fashion for an older demographic that is dependent on a fraying collective order (see Excerpts 72 and 73) for subsistence. This means both contextual and knowledge valences structure the perception of climate change signs and indicators, which is reinforced by the three remaining active codes.

Excerpt 54: Contextual developments often structures signs, including over determinate forms such as Agro-industrial pollution in Trio.

Older Men Focus Group - Trio, Ya'axché, Subset
Interviewer: Is there anybody in the community that you think is more affected by climate change or is it the same?
Respondent 1: Ahh, well that is what all of us feel the changes, where we at the field with other farmers, there's we suffer sun, we suffer water and all of we suffer these.
Interviewer: And what do you think?
Respondent 4: Well, for me let's say like that question you are making, what I see and what I know and what I have lived and also where I work. It is more in the farms, the past year they were applying nematicides.
Respondent: Its goes to the water, then diseases come from there.
Respondent 4: And also to the creeks, the drainage, so there [onwards it] will go to the river. See the disease that affected last year.
Respondent 2: On their eyes, pure blood. Where [did] it came (sic) from up? The plane!
Respondent 1: Came from the air to the creek, affects the fish and then no more fishes (sic). Aha, no more fishes (sic), but drought.
Interviewer: So, you were saying everybody is affected the same?
Respondent 1: Yes.
Interviewer: […] Who does the airplane spray[ing]? Spraying [from] the airplane?
Respondent 2: The spraying, well the truth is that we do not know who.

Respondent 3: Before it was for [agro-industrial producer A (name redacted)]. Respondent 1: But now it is for [agro-industrial producer B (name redacted)].

Excerpt 55: Heightened concerns about direct links between weather changes and increased maladies.

Older Women Focus Group – San Miguel, Ya'axché Subset
Interviewer: Is there anything happening in the village that you think with the weather that is different? Respondent 1: Only when it is cold now. Interviewer: What do you think is causing that? Respondent 1: I don't know what is causing it. Interviewer: Is that causing any problem in the village? Respondent 1: No. I don't think so. I think it only bring[s] sickness, [which] it is causing to our kids. Respondent 2: The same thing when it brings sickness, but we can't help it. Respondent 3: The same thing because you see when it's cold like this it brings a lot of things and if you don't pay attention to something, it will hurt you more because it is cold.

Fish stock, forest fires and soil erosion are entirely grounded in distinct localities and are accounted for by specific population groups in those areas. Fish stock, which accounts for three percent of the prevalence for signs/indicators, is only active in Trio and is entirely accounted for by older men (both directly (25 percent) and indirectly (75 percent) engaged by the project), who explicitly draw upon both experiential knowledge and distinct contextual challenges with pollution to underscore observed diminution in fish stock. Similarly, older men in this locality account for the single instance of prevalence in the data associated with Forest Fires (one percent). Flowers Bank accounts for the entirety of the three percent prevalence observed for soil erosion. In all instances it is associated with land loss along the banks of the sections of the Belize River on which the village rests. Similarly, two distinct groups in this locality account for this level of prevalence: young women (two-thirds) and older women (one-third). Overall, men (primarily older men) account for a vastly greater portion of the prevalence for signs/indicators. They also register prevalence for the widest array of perceived markers of climate change in the dataset (six of seven, compared to five for young women, four for older women and three for young men). This is indicative of higher ideational exposure as both older men and young women have the highest level of premium climate knowledge and perceive a higher number of signs/indicators of climate change.

However, older men, who have relatively greater access to current, manifestly credible sources of climate knowledge, accounting for the entirety of prevalence associated with project intervention and more than a third for news (36 percent), perceive slightly more signs than young women who overwhelmingly depend on a distal source that is no longer accessible (school). This is significant as the perception of signs and indicators is a crucial indicator of knowledge mobilization, which is likely more effective and substantial where knowledge sources are current and substantial.

While men overall (primarily older men), account for nearly two-thirds (or 76 of 119 – 58 of which are accounted for by older men alone) of the prevalence for the theme, all other cohorts account for comparable levels of prevalence (older women: 23; young women and young men: 18) and young women, who have the same level of premium climate knowledge as older men, narrowly outstrip young men. This is also reinforced by the fact that Trio, the village with the most organized, comprehensive and sustained climate change-oriented activity, which is primarily focused on engagement within a domain dominated by older men (climate smart agro-forestry farming), shows the greatest degree of gendered and overall cohort disparity in terms of prevalence for climate change signs/indicators. Older men (direct and indirect beneficiaries) account for more than 60 percent (35 of 56) of the prevalence for the theme in the village, compared to Flowers Bank, where young women account for half of the theme's prevalence, alongside older men and older women who are equally matched at 25 percent each and Indian Creek, where older men, young men and young women account for similar levels of prevalence (nine, eight and seven, respectively). Even in San Miguel, where only older men and women were sampled, there is relatively similar levels of prevalence (five and three, respectively). So, the overall gendered disparity noted is largely accounted for by Trio, which has the most

comprehensive and sustained engagement programme, including a dedicated institutionalized mechanism for the management of an agro-forestry concession area within a critical nature reserve. This suggests the nature of the sustained and comprehensive engagement process in Trio, one of only two villages where the intervention is an initial source of climate information, is a differentiating factor that accrues knowledge operationalization advantages.

An assessment of the range of perceived climate actions underway in the villages relative to the array declared by the interventions is likely to clarify the efficacy of the nature of information provision and broader engagement modalities. It will illuminate why the same level of knowledge operationalization observed for the identification of signs and indicators is absent from the dataset for Indian Creek, where project intervention is also a primary credible initial source, as well as the absence of knowledge operationalization distinctions among primary beneficiaries in Flowers Bank (older women).

Nonetheless, the observance of a durable and dominant food security frame that is widely perceived across localities and cohorts, as well as the discernibility of other compelling contextual signs/indicators, even where climate knowledge is limited, comports with indigenous "articulations of struggles to sustain environmental identity and heritage in the face of threats to the physical resources that shape their living ecology and the threats to values, beliefs, behaviours, histories, and languages" (Anchorage Declaration, 2009, cited in Figueroa, 2011, p. 232)). This is in stark contrast with the primarily western and urban extant literature that casts communicating climate change as distinctly challenging because of the presumed "invisibility of causes, distant impacts and a lack of immediacy and direct experience of impacts" (Moser, 2010). This means probing the nature of perceived climate actions in relation with the contextual and knowledge structured distinctions in signs may also clarify a productive course of action.

Specifically, the comparative analysis will further clarify multiple resonant frames and messages for specific cohorts and localities that Nisbet (2009) suggest can optimize understanding, knowledge operationalization and action.

Climate Action

Table 50: The relative prevalence of climate actions identified by study populations in Belizean villages

Subset	Village	Agroforestry		Bee-keeping		Bird Conservation/ Tracking		Inaction		Multi-Cropping & Seed Dispersal		Planting Trees/ Afforestation		River Buffer		School/General Clean Up		Taboo/No Take		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Ya'axch	Indian C	9	26%	4	12%	2	6%	14	41%	0	0%	3	9%	0	0%	2	6%	0	0%	34
	San Mig	2	22%	0	0%	0	0%	3	33%	2	22%	0	0%	1	11%	0	0%	1	11%	9
	Trio	17	50%	4	12%	0	0%	13	38%	0	0%	0	0%	0	0%	0	0%	0	0%	34
CCCCC	Flowers	0	0%	0	0%	0	0%	30	100%	0	0%	0	0%	0	0%	0	0%	0	0%	30
Totals		28	26%	8	7%	2	2%	60	56%	2	2%	3	3%	1	1%	2	2%	1	1%	107

A half of the 18 markers of climate action are active in the overall data for the Belize case (see Table 50). All nine active codes are evident in the Ya'axché subset but only one, inaction, is active in the CCCCC subset (Flowers Bank). This is significant, as inaction indicates that the sample population does not know that there is climate change action underway or was conducted in their community. Per Excerpt 56, this is even evident in instances where they were directly engaged and lead coordination of activities at the cohune nut production facility. This is indicative of the nature and quality of the ideational component of the activity.

While Flowers Bank is the only village where inaction accounts for the entirety of prevalence for climate change action, it is the most grounded indicator of action in all villages (41 percent in Indian Creek and a third in San Miguel), except Trio, where the level of organization and texture of sign and indicators suggests higher and more sustained engagement, which boosts ideational levels. But even in Trio, agroforestry, which accounts for half of the prevalence for climate action in the village, only narrowly outstrips Inaction (38 percent). Beekeeping, which accounts for 12 percent of prevalence in Trio, is the only other active code in the dataset for the locality. These three factors (inaction, agroforestry and beekeeping) also

figure in the top three most grounded actions in Indian Creek, the only other village where the project intervention discernibly structures climate knowledge, but in a different order.

The three factors (Inaction - 41 percent, Agroforestry - 26 percent and Beekeeping -12 percent) also feature alongside the broadest array of active codes denoting climate change activity in the overall dataset (six). Planting trees (nine percent) and bird conservation and school clean-ups (six percent each) are the other active codes. San Miguel, which is also marked by a relatively higher number of active codes denoting climate change activity in their locality (five of nine), shows a distinct order of resonance for actions that are more evenly distributed. While inaction is its most resonant indicator with prevalence of a third, the second and third most grounded actions (agroforestry and multi-cropping) each account for more than a fifth of prevalence. Similarly, river buffer and taboo/no take, which are the only other actions with prevalence in the subset each account for approximately a tenth (11 percent each).

Overall, the data suggests men are vastly more aware of specific climate change actions underway in the localities studied in Belize, primarily because project engagement is largely framed around their culturally defined work. Overall, men account for more than two-thirds of the specified climate change actions evident in the dataset (all of which are in the Ya'axché subset). This is a significant gendered disparity as older men and younger men account for nearly identical levels of prevalence for this indicator (14 versus 13) and both outstrip their female peers (older women - seven, young women - six). Trio is the only village where this gendered disparity is not observed. While men, who account for a significantly greater portion of the sample in Trio and invariably account for a greater degree of prevalence associated with specified actions (62 percent), a more granular look shows a more even distribution across groups. Both sets of men (direct and indirect beneficiaries) account for 24 percent each; women

(young and older) each account for 19 percent and young men account for 14 percent. This is in part due to the direct engagement of young women through beekeeping in the village, which has discernible climate-adaptive elements (see Excerpt 57).

Consistent with the observation that ideational exposure is a determinative feature of climate change interventions in people's ability to articulate signs/indicators, actions, cause and other variables, older men who tend to be the primary beneficiaries of the project, account for the least level of prevalence associated with inaction (10 percent), which is entirely accounted for by a group of indirect beneficiaries in Trio. All other groups in the Ya'axché subset account for comparable levels of prevalence for inaction: older women - a third, young women - 30 percent and young men - more than one-quarter (27 percent). Against the backdrop of the complete absence of perceived climate action in Flowers Bank, where a dual livelihoods and energy climate initiative is underway, the high prevalence and first order rank of inaction in all contexts except Trio strongly indicate that the endogenous origins of these scaled actions that reflect strategic regional climate response priorities do not preclude them from structural limitations that manifest in engagement practices and ideational deficits.

With respect to Flowers Bank, the data strongly suggests a clear separation of the two components: livelihood (adaptation) and renewable energy (adaptation and mitigation) and the absence of an information provision mechanism that cauterizes the potential transformative impacts of a conceptually comprehensive intervention that tackles both the root cause of climate change (fossil fuel consumption) and boosts adaptive capacity to navigate climate impacts. The implication is that the intervention in Flowers Bank boosts adaptive capacity but from an entirely subsistence or economic frame.

The manifestation of an economistic and subsistence frame where an endogenously conceived initiative ought to have enabled transformation adds credence to Webster and Engberg-Pederson's (2002, cited in Holland, Brockles and Abugre, 2004) critical distinction between strategies by the disadvantaged to access resources and those that influence policy design and implementation with redistributive and equity motives. So palpable are the knowledge operationalization deficits induced by the absence of an information provision mechanism that directly engaged respondents do not even perceive the production of smokeless charcoal from a renewable source (naturally harvested cohune) as a climate-smart outcome of their upgraded facility. These negative ideational outcomes limit the population's ability to fully grasp and effectively structure the transformations made possible by the intervention because information and communication are pre-requisites for creating entry points for transforming social structures (Dutta, 2011). So, while the project is marked by endogenous origins rather than exogenous pre-determination, it manifests in a manner consistent with what Masaki (2004) observes as the instrumentalization of participation in development processes that undermines grassroots impulses.

Conversely, what obtains in the Ya'axché subset is a product of the narrow reach of a variably targeted, sustained and comprehensive intervention across localities (see Excerpt 49). Through this modality, groups engaged for longer periods (older men) and localities where multiple cohorts or groups are engaged (older men and young women in Trio), exhibit knowledge advantages, including knowledge mobilization (perception of signs/indicators and actions). Trio's distinction on these measures is underscored by the fact that its directly engaged cohorts, particularly the self-mobilized cocoa and coffee farmers, constitute Ya'axché's initial pilot group, which means they have had decisively more exposure tailored to their specific crop

focus (see Excerpt 13) or distinct domain of interest (see Excerpt 57). This offers reinforcement of the inference drawn earlier about climate knowledge transference patterns in Trio over time and the contention that the emphasis on scale in ecological approaches should be considered against time in forecasting the success of activities with sub-maximal intervention levels.

The fissures in climate knowledge and its operationalization, as well as the limitations of the intervention's information provision mechanism both clarify critical targeted audiences and their climate information needs, as well as illuminate the nature and conditions under which information provision mechanisms can be effective in boosting knowledge operationalization at multiple levels (population and cohort levels). Knowledge operationalization, such as the perception of signs/indicators and identification of actions, is critical for enabling effective climate responses. Probing other markers of knowledge mobilization, such as cause and proximity, is therefore likely to further clarify the utility and limits of the existing information provision mechanism and critical leverage points and frames for optimizing climate knowledge and action in these contexts. Cause and proximity are particularly important given the observation that climate change is primarily perceived through a food security frame in these contexts.

Excerpt 56: Subsistence and economic frame devoid of Information undermines awareness of climate action even among the engaged

Young Women Focus Group - Flowers Bank, CCCCC Subset
Interviewer: [Is] there any climate change work taking place in your village? Respondent 2: I don't think so. Respondent 1, 2, 3 &4: No. Interviewer: No. You're [pointing at Respondent 1] in training to do the Cohune project, right? [Respondent 1 nods affirmatively]. Do you think that has anything to do with climate change? Yes, or no? What do you think? Respondent 1: Well…I don't know. I am not sure.

Excerpt 57: Sustained engagement around focused activities boosts perception of signs and accrues knowledge operationalization advantages.

Young Women Focus Group – Trio, Ya'axché Subset
Interviewer: Are you involved with anything Ya'axché doing in the village? Respondents 1, 2 & 3: Yes. Respondent 4: No. Interviewer: What do you do with Ya'axché? Respondent 1: Beekeeping. Respondent 2: Well, in the school, in beekeeping Respondent 3: Beekeeping. too.

Respondent 4: Nothing.
Interviewer: What does Ya'axché do with you with the beekeeping?
Respondent 1: Well, we gather for us to know about beekeeping and they help in giving the box where they keep the bees.
Interviewer: And that's what all of you do with Ya'axché?
Respondents 1 & 2: Yes.
Interviewer: Is there anything about climate change that Ya'axché is doing?
Respondent 1: I think it is with the beekeeping, like the food for the bee. Like when it's flowering time, the flower is there for them to feed on.
Respondent 2: Well, I don't know.
Interviewer: Is Ya'axché doing anything on climate change in the village?
Respondent 1: I don't know, but maybe they are with the farmers that plant cocoa.
Respondent 2: Well, I don't know.
Respondent 3: I don't know. Maybe.
Respondent 4: I don't know.
Interviewer: Are you familiar with the concession area?
Respondent 1: Yes, we know a little bit.
Respondent 2, 3, 4 & 5: Yes.
Interviewer: Do you think that has to do with climate change?
Respondent 1: When I hear that, it is about the people who are planting cocoa. They save their land; they don't kill the animals; they don't use chemicals in their farm.
Respondent 2: Well it is the same thing on what she said.
Respondent 3: Same thing.

Excerpt 58: Sustained and focused engagement among the self-mobilized accrues knowledge mobilization advantages in Trio.

Older Men Cocoa Group – Trio, Ya'axché Subset

Interviewer: So, does Ya'axché talk to you guys about climate change […]?
Respondent 1: Yes, we understand a lot, but we have not do [sic] it now, until now we are talking about that.
Interviewer: […] He [respondent 2] was telling us some of the things Ya'axché has being working on. So, now, what are the activities you are doing in the forest, with whatever you are working on with Ya'axché? Can tell me?
Respondent 4: Well, our activity is that one [cocoa planting/agro-forestry.] We have been saying that.
Respondent 2: That we are working in the sense on the plan that the forestry and the minister has advise us how we should handle and cut down all trees [in the] forest. Always to leave 50 percent per say.
Respondent 5: We are trying to work out that plan and to see, as how I said, we are just starting just getting to the third year [2015 to 2018], and now I am not sure if we can see the changes but there we are getting step-by-step.
Interviewer: Yes, and you are working in the same thing. Is there another, you are not a member of the cacao group. You are a member of the group of the community. Ahh, I see. So, OK. […] Do you think Ya'axché is doing a great job yes or no that?
Respondent 4: Well, for me, I saw it and I think it work[ed] quite good [sic]; and about the mountains, we started to work and Ya'axché came and we plant cocoa. So, the Forestry [Department of Central Government] said [named of Respondent 4 redacted], you cut down trees to plant cocoa, so you have to plant some in return as well, but not doing now because [I] am not cutting down trees. Now I have to cut down some trees because there is too much shadow and [with] too much shadow the cocoa doesn't [sic] grow good [sic]. Now there is some cocoa, and these are clean, so you can see if the cocoa is growing and the trees. [Then] I [will] see if [it] is good job about Ya'axché. [Crosstalk]
Respondent 3: Well, with what I see now I think yes, I would say that it is a good starting, like how I said there are things I don't know, in many lives and people had brought to us, so like the mind understand a little better and is see that on Ya'axché.
Interviewer: What are some good results you are seeing?
Respondent 3: Well the results are that let's say like how I say not to work anymore at the company but to work on our own, not to use chemicals, use everything organic, let say like when I go to the company, I have always work temporally there and it is very different, aha because the forest would not feel the fumes of the poison rather good air, what we do there we feel it a lot, the changes there are sometimes, like in the summer here, is too much heat and in the company, we cannot stand it, when we go to the forests how we feel here now so it feels there.
Interviewer: And [do] you think Ya'axché is doing a good job? Yes, or no.
Respondent 2: Yes, it's OK. It's a change now for us. It's a protection for plant and trees.
Interviewer: Sure.
Respondent 5: Well, I think yes because I have some meetings with Ya'axché group and the intentions are very good. In addition, also to the community and I have seen the help in the Cocoa Group. They helped. I live in the highway and I see them very frequently that they are enhancing the interest in helping the group and the community. It is very interesting and very good what they do.
Interviewer: […] Did Ya'axché ask you about your opinion before they develop the project or did they just come and say let's do this?
Respondent 4: Well, we started to plant cocoa but first we planned to plant coffee from the first time. So, we leave coffee to plant cocoa, after we talked with Forestry and Ya'axché, we decided for cocoa. Look at me, Ya'axché help[ed] me a lot. For example, they built a bridge to cross the river to take out the cocoa harvested like in two years.

Interviewer: So, the idea to plant cacao, [it] is yours, not Ya'axché?
Respondent 3: Yes.
Respondent 4: Yes, it's our idea.

Cause and Proximity

Table 51: The relative prevalence of perceived causes of climate change across study populations in Belize.

Subset	Village	God/Religion		Humans		International		Local		National		Nature		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Ya'axché	Indian Creek	0	0%	3	30%	2	20%	1	10%	2	20%	2	20%	10
	San Miguel	0	0%	0	0%	0	0%	0	0%	0	0%	2	100%	2
	Trio	2	3%	29	46%	2	3%	29	46%	1	2%	0	0%	63
CCCCC	Flowers Bank	5	23%	6	27%	0	0%	6	27%	0	0%	5	23%	22
Totals		7	7%	38	39%	4	4%	36	37%	3	3%	9	9%	97

All six codes associated with cause and proximity are active varyingly in the overall dataset (see Table 51). Even in the Ya'axché subset, where all codes are active, five are registered in Trio and Indian Creek each, but only one registers in San Miguel. In Flowers Bank, four codes associated with the theme are active. Overall, human and local action account for the greatest degree of prevalence associated with cause and proximity, accounting for 39 percent and 37 percent, respectively. Nature is the only other analytical unit to register in at least three villages in the subset. Attribution of cause to humans ranks first in terms of prevalence in all villages except San Miguel, where nature accounts for the entirety of the prevalence for cause and proximity. Although attribution of responsibility is overwhelmingly attributed to human activity across the majority of villages, which is consistent with scientific consensus, this is to varying degrees. In both Trio and Flowers Bank, human activity ranks first in terms of prevalence alongside local activities (29 each in Trio and six each in Flowers Bank). This suggests a tendency to localize cause and impact compared to San Miguel where it's entirely externalized to nature and Indian Creek where a broader array of externalization accounts for 60 percent of prevalence associated with cause and proximity for the locality: International, National and Nature, each with 20 percent relative prevalence. Local attribution of cause only

accounts for a tenth of relative prevalence in Indian Creek, which is in stark contrast to the 46 percent in Trio and 27 percent in Flowers Bank.

While the localization of cause, which is especially pronounced in Trio where ideational exposure is relatively greater, conflicts with scientific consensus on climate change that attributes responsibility at spatial and systemic levels removed from these subsistence and semi-industrialized contexts, a range of prevailing contextual challenges illuminates this perceptual disposition. Specifically, emerging contentions about chemical use and pollution practices at commercial plantations adjacent to Trio overdetermines perception and attribution of the cause and proximity of climate change (see Excerpt 54). So, while there is a connection between the industrial farming activities that structures perception of cause and proximity in this context, there is need for relevant information provision to improve understanding and knowledge operationalization. Addressing this critical knowledge operationalization gap is important for mobilizing agency and motive, which are central for effective climate action. Addressing the substantial level of localization of cause in Flowers Bank, where it accounts for more than a quarter of perceived cause and proximity, is even more central.

While the localization observed in Trio is primarily attributable to a specified commercial actor with no binding connection to the community, the tendency to localize cause observed in Flowers Bank is diffused across the population. While the actions profiled, namely deforestation, and slash and burn, are legitimate factors, at the village scale they are overdetermined. These specified actions are also construed alongside faulty links such as improper garbage disposal. Improved information provision mechanisms that address these fundamental gaps in climate knowledge and its operationalization are likely to limit the negative impacts of overdetermined and faulty localization of the cause of a fundamental challenge in a small village where the

mobilization of social cohesion is central for addressing current and projected climate change impacts. The contextual nature of the localization of cause and associated knowledge deficiencies in both contexts comports with the contention that "a variety of factors other than scientific knowledge of causes and solutions [are] being used to form climate change attitudes, preferences and behaviours" (Maibach, Roser-Renouf & Leiserowitz, 2008, p. 495). However, the existence of substantial accurate attribution of cause, as well as perception of signs means there are durable frames around which knowledge improvement may be enacted.

There are also distinctions in the externalization of responsibility for climate change that have strong associations with ideational exposure. In Flowers Bank, externalization of cause accounts for 46 percent of relative prevalence (God/Religion and Nature 23 percent each) and a mere eight percent in Trio (God/Religion and International at three percent each and National at two percent). Externalization of cause in Flowers Bank and San Miguel are entirely accounted for by factors outside of the control of humans. In Flowers Bank, God/Religion and Nature show equal levels of prevalence on this measure (five of 22 each), while nature accounts for the entirety in San Miguel. Conversely, nature is the only externalization outside of the control of humans to show prevalence in Indian Creek. Nature only accounts for a third of the high degree of externalization (60 percent) observed in the data for Indian Creek. In Trio, where externalization is less than eight percent, only one factor outside the control of humans is cited (God/Religion at three percent). Other external factors or spheres of action (national and international at five percent), where human decision-making can be decisive, outweighs the prevalence for God/Religion. So, Trio, the village with the most sustained, comprehensive and tailored climate change intervention mechanism, alongside the widest tapestry of manifestly credible and current sources of climate change information (news and project intervention), more

accurately attributes cause to humans—notwithstanding the overdetermined or hyper-localization caused by prevailing agro-industrial activities in proximity to the village. Relatedly, while externalization is consistent with the holistic and culturally bounded nature of indigenous knowledge (Duhaylungsod, 1993; Reichel, 1993), the higher prevalence of externalization of cause outside of the control of humans associated with the only two villages (Flowers Bank and San Miguel) where the project intervention does not feature as a primary initial source of climate change information, strongly supports the observed link between ideational exposure, primarily through the project and other manifestly credible and current information provision mechanisms (namely news).

The unique combination of a sustained, comprehensive, tailored and practical information provision mechanism (the project intervention) alongside another current modality that provides broad and readily accessible information is likely to function in complementary fashion to positively structure climate knowledge and operationalization such that Trio has the lowest climate knowledge gap. This is underscored by the fact that San Miguel, where no manifestly credible initial source of climate change information is cited and the Ya'axché-led intervention is most belated, is maximally disposed towards externalization of cause outside of the control of humans. Similarly, Flowers Bank, where the data suggests the CCCCC-led intervention is marked by subsistence and economics and devoid of information provision (see Excerpt 56) and the population's only currently available credible source is news, ranks second for externalization of cause outside of the control of humans. Further, there is a lower level of seemingly immutable externalization of cause for humans in Indian Creek compared to Trio, where news is cited as an initial source and discrete cohorts are also benefiting from the comprehensive, tailored, sustained and practical Ya'axché-led intervention. The implication is

that the practical element of the information provision mechanism, which includes international knowledge exchange (per Excerpt 49) is likely decisive.

There is no consistent gendered orientation with respect to cause and proximity. Young women and older men, who have higher levels of premium climate knowledge, are least likely to externalize cause. Young women entirely attribute cause to local activities by humans, whereas externalization associated with older men's attribution of cause only accounts for five percent of relative prevalence (God/Religion, Nature and International registering equal levels of prevalence: two percent each). Considering both cohort's relative knowledge advantages and earlier observations about the nature and challenges associated with the localization of cause in these contexts, this further underscore substantial gaps in the scope of the information provision mechanisms available in the villages. On the other hand, older women and young men externalize cause at comparable and substantial levels: Two-thirds and 55 percent, respectively.

However, young men's externalization of cause is equally split between factors humans can (national - three and international - three, six of 22 each or 27 percent) and cannot control (nature - five and God/Religion - one, 27 percent), which is consistent with the cohort's dependence on school as a primary source of credible climate knowledge, which is distal and their limited involvement in project interventions across all localities. Meanwhile, older women externalize along dimensions that are entirely outside of their control (God/Religion - five and Nature - three3, eight of 12). This is consistent with the observation that older women are the least likely to cite manifestly credible sources of initial climate knowledge acquisition, are the least informed about climate change impacts due to lower levels of ideational exposure and engagement across the Ya'axché intervention sites and the absence of information provision where they are directly engaged in Flowers Bank through the CCCCC-led intervention.

However, it is instructive to note that the religious externalization among older women is largely accounted for by the cohort in a circumscribed locality (Flowers Bank). Young men in the dataset, primarily from Indian Creek, also show a distinct tendency to externalize along unique dimensions: they account for the greater prevalence for externalization along three of four dimensions: nature (five of nine), national (three of three) and international (three of four). This strongly correlates with their higher initial exposure to climate change knowledge in manifestly credible contexts: namely, school.

As anticipated, substantial distinctions in the perceived cause of climate change and its proximal position to the villages and humans reinforce observed fissures in climate knowledge and operationalization across localities and cohorts. While these distinctions underscore limitations in both the nature of the information provision mechanisms offered by the projects, or the lack thereof in Flowers Bank, they lay bare critical issues/developments (pollution related to agro-industrial activities, values (God/Religion) and biospheric or nature dispositions) about the cause of climate change with which information provision and action must interact generally and for some cohorts in particular, to effectively structure climate knowledge and operationalization. However, it also underscores a need to probe the nature of the substantial levels of seemingly impermeable attribution of cause among discrete population groups and localities because perception of cause structures agency, which is critical for mobilizing populations for effective climate action. Additionally, the localization of cause variably observed in the dataset necessitates an exploration of climate risk perception to delineate how the varied dispositions and values interacts with climate information provision mechanisms to structure another indicator of climate knowledge operationalization. Accordingly, the subsequent section explores climate risk perception to further inform climate knowledge operationalization and underscore

the analysis of agency necessitated by evidence of perceived limits to action and disproportionate localization of cause.

Climate Risk

Table 52: The relative prevalence of climate and vulnerability risk markers perceived across study populations in Belize

Subset	Village	Coastal/ Riverside Dwellers		Elderly		Equal Risk		Farmer - 2		Me		Density
		Rate	Prev	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Ya'axché	Indian Creek	0	0%	4	29%	6	43%	4	29%	0	0%	14
	San Miguel	0	0%	0	0%	3	100%	0	0%	0	0%	3
	Trio	0	0%	0	0%	10	67%	5	33%	0	0%	15
CCCCC	Flowers Bank	2	11%	0	0%	13	72%	2	11%	1	6%	18
Totals		2	4%	4	8%	32	64%	11	22%	1	2%	50

Five of the nine codes denoting climate risk are active in the Belize dataset: three in the Ya'axché subset and four in the Flowers Bank subset (see Table 52). Overall, equal risk accounts for nearly two-thirds of prevalence associated with climate risk (64 percent). Farmers are also perceived to be particularly vulnerable, accounting for more than a fifth (22 percent) of the prevalence associated with climate risk overall. The elderly (four of 50), coastal/riverside (two of 50) and self/me (one of 50) are the only other active markers of perceived climate vulnerable groups that registered prevalence. However, they only register in circumscribed localities: Indian Creek in first instance and Flowers Bank for the latter two. The location specificity of these three markers of risk is indicative of the importance of context in structuring the nature of climate risk perception and the observation in the previous section that climate perceptions, attitudes and behaviours are structured by a range of factors other than climate knowledge (Maibach, Roser-Renouf & Leiserowitz, 2008). Indian Creek is a largely ageing context in which the limited adaptive capacity of the elderly is of concern (see Excerpt 59), whereas Flowers Bank is physically distinct from the other villages as it is on the banks of a major river, which figures in the declaration of risk specification of both coastal/riverside and self/me not withstanding knowledge operationalization challenges in discerning climate action (see Excerpt 60).

This pinpoints the possibility that farmers are the only specific group perceived as distinctly vulnerable across the study populations (all villages except San Miguel where only equal risk registers prevalence). Farmers are specified as a vulnerable group most notably in Trio, where the category accounts for a third of the prevalence for climate risk. In Indian Creek, farmers accounts for 29 percent of prevalence alongside the elderly, while it accounts for just more than a tenth (11 percent) in Flowers Bank. While the specification of farmers is consistent with a high dependence on rainfed agriculture and the primarily food security frame through which climate change impacts are perceived, the higher prevalence of specification of farmers in Trio and Indian Creek is also consistent with the villages' comparatively more sustained exposure to a practical intervention mechanism focused on the domain of farming.

However, equal risk is the primary way climate vulnerability is viewed in Belize across all villages sampled. Equal risk accounts for the entirety of prevalence associated with climate risk in San Miguel; 72 percent in Flowers Bank, where the broadest distribution of risk/vulnerability is observed (four codes) because of its contextual distinction (the village is on the banks of a major river) and two-thirds in Trio. It is only in Indian Creek that equal risk does not account for more than half of the prevalence denoting climate risk (43 percent), but it still ranks first ahead of the specification of the elderly and farmers, which are the only other active units in the subset (with equal prevalence of 29 percent each). This overall tendency to view climate risk as equally distributed is consistent with the overall communal nature of the villages.

The primacy of farming for subsidence and employment in these contexts further underscores the collective or shared risk perception in these contexts, as constraints in farming interpolates all households. This underscores another contextually critical master frame, alongside food security, for the provision of essential information of greatest import for

understanding and navigating prevailing and projected climate risks. The identification of these durable and highly resonant frames comports with Fischhoff's (2007) observation of persuasive communication techniques amidst urgent geologic change. Their shared nature contrasts with findings from studies explicitly linking perception of climate change risk and impacts. Specifically, the contention that individuals perceive climate change impacts to be greater for others than themselves (Board, Fisher & O'Connor, 1998; McDaniels, Axelrod & Slovic, 1996). While the shared perception of risk holds true across demographics, gender and age combinations strongly correlate with the perception of risk. Whereas equal risk only accounts for a half of the prevalence for perceived climate risk among young men and young women, it accounts for a clear majority for both older women and older men (92 percent and 59 percent, respectively).

Consistent with the observation that context significantly structures climate risk and engagement structures climate knowledge operationalization, it is older men, primarily in Trio where direct and sustained engagement related to climate-smart agro-forestry is underway, who largely account for the specification of farmers as a distinctly vulnerable group, accounting for nearly two-thirds of the prevalence for this measure. This observation is corroborated by the high perception of farmers as a uniquely affected group by older men in Indian Creek, who have also been directly engaged (see Except 59). The fact that older women show the least varied array of risk perception (two active codes but overwhelmingly favouring equal risk, compared to four markers of risk perception for both young women and young men and three for older men that are more distributed in terms of prevalence) is consistent with their lower ideational exposure. This further suggests that while climate risk perception is contextually and culturally structured (per the dominant equal risk or communal disposition), it is not entirely independent of climate

knowledge. This supports my hypothesis that probing climate risk perception clarifies a crucial element of knowledge mobilization. The implication is that at a population level, climate information provision modalities will be most effective where they respond to the communal risk disposition, but tailored messaging, practical actions and associated support responsive to the specific risk perceptions in particular contexts and for distinct cohorts are also highly necessary and likely impactful. In fact, both approaches can likely function complementarily with heightened outcomes (ecological approach), where they effectively mobilize the internal-risk disposition alongside the master and supporting frames noted due to the highly discernible and widely perceived existential manifestations of climate impacts.

Having identified a primarily communal-risk disposition in the Belizean study sites and noted the structuring effect of substantial fissures in the nature and availability of climate information, an assessment of climate agency is likely to indicate the extent to which messaging and actions framed around this shared risk disposition—alongside perceived signs/indicators, primarily food security and cause—are likely to be effective. The prominence of externalization of cause to seemingly impermeable non-human actors (God/Religion and Nature) observed in the review of cause attribution also means that probing climate agency is likely to reveal both the limits of climate response mechanisms (information and actions) and the conditions under which improvements are likely to be most effective.

Excerpt 59: Risk specification is primarily framed around contextual demographic trends and perceived adaptive capacity deficits among the elderly

Older Men Focus Group - Indian Creek, Ya'axché Subset
Interviewer: Do you think climate change affects or will affect [..] anybody more than anybody else? Respondent 1: Well, when I see it now, it is that we are trying to save ourselves from it only when we see that the weather is changing. Well, as a farmer, we figure out which day is good to plant some of our crops, like how Mr [Respondent 2's named redacted] said, you just have to know how to plant. But, like I said, we know how to balance it because we don't know how it will be next two years if it will still be the same or different. Well, as far as I see, nobody is affected or maybe I don't know. Respondent 2: Well, it is not affecting all of the people in our community, but I think it affect few of the people because that they don't know what climate change is. [It] is different because they believe that weather. In our community of Indian Creek, we have seen some of the few people, they know when to plant their corn because our grandfather or whoever told us when the planting season the macabre season is in May the thirteenth or the fourteenth, so they tried and plant that same month in this four or five [past] years now. But it doesn't work again; no more, because that time it is still a dry season for us. So, few of them plant, and yes the corn start[s] to grow, but in [a] few months everything is dry due to the sun. So, there is where few people start to believe that climate change is affecting. I more

believe it is we [sic] in planting, and now we can't do that anymore. The planting season is in June, it is not everybody it is just few of the people in the communities it not a group it is just that one and two people in the community, well the person that I have seen that we normally talk out there. Like, we said the term; sometimes we exchange thoughts to each other. So, we could get the knowledge of what is happening. It is men, the farmers are the most affected.
Respondent 3: Well in my case, […] the people who will get affected by climate change [the most] is [sic] the one that don't adapt their self to the ago-forestry sustainable planting. The people who will get affected is [sic] the one who just depend on one crop or depend on the slash and burn that's the one [who] will get affected because they only depend on one crop of the year, but if you adapt yourself into ago-forestry sustainable cocoa growing or in any ago-forestry you are not going to feel the real effects of the climate change because remember the trees are going to bare not in one time, this one will bear this month, that one will bare next month and then that's the climate system. But if the person who just depend on just the corn or the beans, they will get affected because they are used to [the] time when they first do their crop, but when they do that now, they will get affected.
Respondent 4: Well, as those are saying that, the older people because they don't really understand what climate change is. How does climate change affecting [sic] but like for the young generation now; they are getting study, they are getting to learn what is - about climate change. But not like the older people. Older farmers, you know, like my father. He doesn't know because he [is] use [sic] to do slash and burn planting before. In their time, they only plant one time for the year, but now farmers get to plant two times for the year. They plant in May and in October or in November. That is the macabre (corn) that we plant in October and November. So, the slash and burn, they have proper name for that the milpa, the milpa farming planted in May. But now as you plant in May, you won't get anything.

Excerpt 60: Risk specification is structured by contextual factors (presence and proximity to rivers) even where climate knowledge and perception of action are constrained.

Young Men Focus Group - Flowers Bank, CCCCC Subset
Interviewer: So, you think your village is affected by climate change? Respondent 2: Yeah. Interviewer Is there any other way you see it affecting the village? Respondent 2: No. Interviewer: Where did you first learn about climate change? Or where do you get any information about climate change? Respondent 2: On the news. Interviewer: On the news? And have you ever heard the term climate change? Respondent 3: Yes. Interviewer: Do you think your village is affected by climate change? Respondents 3: Yes. Interviewer: How? Respondent 3: Right now. Like the river. The river, no usually (sic) get rain this time of year. Interviewer: So, the river [is] overflowing and it doesn't usually happen this time of year. Where do you get your information about climate change from? Respondent 3: School. Interviewer: Have you ever heard the term "climate change"? Respondent 4: Yes, Sir. Interviewer: Where? Respondent 4: School and from my parents. Interviewer: School and your parents. And do you think the village is affected by climate change? Respondent 4: Yes, Sir. Interviewer: How? Respondent 4: Like for example the weather. Like starting of the year, it doesn't usually rain that much. Interviewer: And it's raining a lot now…which is why you're [pointing at respondent 3] saying the river is overflowing. Do you think climate change is affecting anybody more than anybody in the village? Respondent 4: The farmers. Interviewer: The farmers. What do you think is anybody affected more than anybody else? Respondent 2: No[t] really. Interviewer: No. [Is] anybody else more affected than anybody else? Respondent 3: People who live close to the river. Interviewer: People who live close to the river. OK. The river[side dwellers], what happen to those people? Respondent 3: They get affected by water. Interviewer: […] Is there any climate change project taking place in the village? You have to say it. So, Yes or No? Respondents 1, 2 & 4: No. Respondent 3: Nope.

Climate Agency

Table 53: The relative prevalence of forms of climate change agency across study populations in Belize

Subset	Village	Failed Actions		Fatalism		Mixed - Agency		Nature 2 - Agency		None		Optimism		Religious		Resource Gaps		Totals
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Ya'axché	Indian Creek	0	0%	3	7%	6	13%	1	2%	1	2%	15	33%	1	2%	18	40%	45
	San Miguel	0	0%	2	13%	8	50%	3	19%	0	0%	2	13%	0	0%	1	6%	16
	Trio	0	0%	3	7%	8	20%	0	0%	0	0%	14	34%	2	5%	14	34%	41
CCCCC	Flowers Bank	1	2%	10	19%	4	8%	4	8%	0	0%	5	9%	5	9%	24	45%	53
Totals		1	1%	18	12%	26	17%	8	5%	1	1%	36	23%	8	5%	57	37%	155

As highlighted by Table 53, eight of the 12 codes associated with climate change agency are varyingly active in the dataset: seven in each dataset (Ya'axché villages and Flowers Bank). Overall, resource gaps account for the greater prevalence associated with the theme (37 percent), significantly higher than optimism, which denotes positive climate agency (23 percent). Mixed agency (17 percent) and explicit fatalism (12 percent) are the other indicators of agency that registered relative prevalence more than a tenth. Resource gaps account for the majority of prevalence associated with climate change agency in all villages, except San Miguel, where mixed agency ranks first with 50 percent and resource gaps account for the least amount of prevalence in the locality (six percent). Even in Trio, where optimism shares first rank in terms of prevalence with resource gaps, the analytical unit accounts for more than a third of prevalence for the locality (34 percent). Resource gaps account for 40 percent of prevalence in Indian Creek and more than 45 percent in Flowers Bank, the village with the lowest level of explicit climate change agency (and the highest level of prevalence for explicit fatalism at 19 percent). Considering the Flowers Bank population's inability to identify the climate-smart livelihoods activity they are engaged in as a climate action, chiefly due to the subsistence frame and CCCCC's bifurcated implementation of a comprehensive initiative devoid of an information provision mechanism (see Excerpt 56), this suggests a positive correlation between agency and resource gaps, largely ideational rather than technical, monetary or otherwise. The positive

correlation between climate agency and resource gaps is reinforced by how informational deficits frame the near totality of expressed resource gaps (see Excerpts 52, 61 (Dialogues A and B), and 62).

The significance of the informational factor and prior observation of its efficacy through practical engagement is underscored by the fact that explicit climate change agency (optimism) is highest in Trio (34 percent) and Indian Creek (33 percent), where practical climate action with the provision of associative information and training are most pronounced and sustained. The import of the practical element is reinforced by the fact that even San Miguel, where climate knowledge is lowest, but has been belatedly exposed to the information provision mechanism available in Trio and Indian Creek, exhibits substantially higher levels of climate change agency (optimism) than Flowers Bank, whose only current manifestly credible source of climate information is news. Despite the low levels of explicit climate agency observed in the dataset, there is substantial mixed agency. The general knowledge seeking disposition that underscores expressed resource gaps, which are primarily of a knowledge deficit orientation (see Excerpts 52, 61 and 62), suggests agency is primarily constrained rather than absent. The data shows that shared risk perception, range of impacts (signs/indicators) and discernibility of climate action, the level and perceptibility of which are structured by the nature and scope of information provision, shape agency. So, positive climate change agency accounted for by a combination of mixed agency and optimism is greatest where action is heightened and proportionate to perceived impacts, and risk disposition is more communal or shared. Specifically, the combination of mixed agency and climate optimism only exceeds 50 percent prevalence in Trio (54 percent – 20 percent and 34 percent, respectively) and San Miguel (63 percent –50 percent and 13 percent, respectively). In Indian Creek, the combination accounts for only 7 percent

(13.33 percent and 33.33 percent, respectively) and only 40 percent in Flowers Bank (17 percent and 23 percent, respectively). So, although knowledge is lowest in San Miguel (63 percent – 50 percent and 13 percent, respectively), where risk disposition is maximally communal and though belated, the village perceives the greatest range of climate actions (alongside Indian Creek).

Similarly, agency on the combined measure is second in Trio, where communal risk perception is dominant (two-thirds of prevalence) and although impact (signs and indicators) is most widely perceived, action is most sustained, comprehensive and recognized at comparable levels to both San Miguel and Indian Creek, while Indian Creek, which reports the same high level of climate actions and an identical range of impacts as San Miguel, is the least communal context and reports lower climate agency than both San Miguel and Trio. Furthermore, the combined indicator of agency is lowest for Flowers Bank, which is the second most communal (72 percent relative prevalence for equal risk) context but perceives no action even as it perceives the second highest level of impact (signs/indicators).

A more granular look at the village level data reveals that resource gaps do not singularly account for the diminished levels of climate change agency. The low level of optimism/climate change agency in Flowers Bank is in part due to the nature of the fatalism (the absence of agency) found in the village. Religion, nature and failed actions account for 42 percent of the prevalence associated with agency. These three factors, particularly religion and nature, which are outside of the purview or control of humans and can function independent of resource provision, underscore the significantly higher degree of explicit fatalism and overall lower level of agency noted in Flowers Bank. So significant are these factors that the village accounts for half of all prevalence for nature and nearly two-thirds (63 percent) associated with religion and the totality of the prevalence associated with failed actions.

The data suggests the dominance of the trifecta of factors that undermines agency is unique to Flowers Bank. In San Miguel where agency is tempered such that mixed-agency accounts for a half of all prevalence and fatalism matches explicit agency (optimism) at 13 percent, it is nature (19 percent) and resource gaps (six percent) alone that curtail agency. In Trio and Indian Creek, where explicit fatalism is lowest (seven percent each), attenuated climate change agency (mixed or lack of) is accounted for by low levels of prevalence associated with religion and/or nature. In Trio, religion is the only other attenuating factor with prevalence of less than five percent, while religion and nature account for identical levels of attenuation in Indian Creek (2% each). It is also significant that the range of constraints associated with agency often manifests as fatalism but not climate denialism. Specifically, these notable constrains prevail amidst no discernible element of climate denialism in the data, which is contrary to conventional assertions of a link with knowledge deficiency. This is likely a product of the high perceptibility of signs, risk and, in some localities, the proportionality and utility of responses.

Excerpt 61: Resource gaps are underscored by information and perceived power and influence deficits

Dialogue A: Older Women Focus Group – Indian Creek, Ya'axché Subset; Informational deficits frames underscores expressed resource gaps.	**Young Men Focus Group - Trio, Ya'axché Subset; Information and perceived power/influence deficits underscores expressed resource gaps**
Interviewer: Do you think that climate change [there] is something that [referencing concerns about crop failure] we can probably do something about it? Respondent 1: We don't know what is causing that to happen. I don't know if we can change that. Respondent 2: Maybe, yes. But, like you see, we don't come together. Maybe it have [sic] a reason to come together, for our village to get better. But who would be in it? It is us. Like how we are saying a lot of days now, the knowledge from a long time ago is being left. Now they are saying that the believers get over, but that is not what it means. But if you think about it, where else to ask. We are supposed to pray and ask God. But that [crop failure and climate change] is what we don't know how to do when there is a lot of sickness and problems that is coming to this world. Now that is where we are at fault when we don't know where the sickness that is coming, come from. The world change, the people change, now it is the young people are growing up and that a lot of problems is coming on us. Respondent 3: I don't know. I don't know how to answer that.	Interviewer: Is there any climate change work or anything to do to deal with climate change in trio? Respondent 1: Well, to me no. Respondent 2 & 4: No. Respondent 3: Well, the truth no. Interviewer: Would you like to learn more about climate change? Respondent 1: We want to learn. Respondent 2: Yea, it is good to learn. Respondent 3 & 4: Yes. Interviewer: Why do you guys want to learn more about climate change? Respondent 1: The first thing that I thought about this, because let's say that before we don't [sic] use to have climate like this. But right now, it changes, but why is this happening? I just ask myself because we can't ask anyone or no more people because we want to know but how can we know? Respondent 2: I want to know more. Respondent 3: Well, just about the topic, in general. Interviewer: Based on what you tell me about climate change, [do] you think there is anything we can do about it? Respondent 1: Because before less industries, factories and fuel, but right now, it is in the village. You can see vehicles, motorcycles… That is what affect the climate, but we can't say right now to let's stop it

	because you don't have to take what the next person got. If he want[s] to buy this, well that is him [sic] right because he have [sic] the money to buy it, but if you tell him or she [sic] not to buy [it] because we [are] the cause [of] climate change… and we are the same one[s] that are causing it because we are used to it. So, we can't say right now let's stop it because we are done used [sic] to it […].

Excerpt 62: Information and knowledge deficits constrains agency but there is a maximalist knowledge seeking disposition.

Young Women Focus Group - Flowers Bank, CCCCC Subset
Interviewer: Do you do anything with the cohune nut facility? Respondent 4: No, not! Actually, not with the mill. My mother makes her own oil. Interviewer: Ok. […] But you're familiar with the project? Respondent 4: Yes. Interviewer: Do you think it's a climate change project? […] Respondent 4: I'm…No. Interviewer: No. That's fine. Remember there is no right or wrong answer. It's just like a set of how you perceive different things. Aright? Would you like to learn more about climate change? Respondent 1: Yes. Interviewer: Why? Respondent 1: […] I would like to learn more because it's affecting the entire world. I would say. In terms of the longer summer before, because I notice right here in Belize we've been having cold that we're not use to. This extent of cold in Belize. Way beyond what we are used to so…It's true. Interviewer: Would you like to learn more about climate change? Respondent 2: Yes, sir. Interviewer: Why? Respondent 2: Because I [do] no[t] know nothing [sic] much. Interviewer: Would you like to learn more about climate change? Respondent 3: I would like to be educated more in depth because then that way it gives you a broader picture of exactly… especially, the things you're doing in your household on a whole. And then with us knowing more about climate change, we can also educate others about the importance of climate change as well. Interviewer: Yeah. Would you like to learn more about climate change? Respondent 4: Yes, I [am] willing because it will teach me how to help my communities, my friend[s], and my family, how to protect the environment.

Overall, the data does not support a strict gendered or age correlation with climate change agency. In fact, younger women and older men account for more than 80 percent of prevalence associated with explicit agency (47 percent and a third, respectively), which is consistent with both cohorts' moderately higher levels of premium climate knowledge (a posteriori). Conversely, young men and older women account for 72 percent of explicit fatalism in the dataset (39 percent and one-third, respectively). However, climate change agency for both young men and older women are undermined by different factors. While they are the only cohorts where resource gaps singularly rank first in terms of prevalence for climate change agency, older women are more affected by this challenge (39 percent of overall prevalence compared to 14 percent for young

men). Older women are primarily religiously fatalistic (see Excerpts 63 and 64), accounting for nearly two-thirds of religious fatalism in the overall dataset. Whereas, young men are fatalistic with a naturistic orientation, accounting for the entirety of the prevalence for fatalism associated with nature (see Excerpt 20).

Overall women show a substantially higher level of resource gap than men (two-thirds of prevalence compared to one-third for men) and this holds true across age brackets, which may account for why young women who outrank older men and all other groups in terms of explicit climate change agency are outstripped by older men when degrees of positive agency (mixed agency) is also considered (47 percent compared to 60 percent, respectively). However, it doesn't explain why older women who have the highest level of resource gaps show twice the level of general agency as young men, despite having near identical levels of explicit agency. This may be due to differences in the nature and texture of the informational orientation of older women's resource gaps. Specifically, older women have the greatest level of knowledge gaps in the dataset, perceive comparable levels of signs as young men but discern less than half the level of climate action noted by young men. Alongside older women's near maximally shared risk perception (92 percent), this suggests both their knowledge deficiencies and perceived uniformity in risk and benefits may account for the higher levels of agency relative to young men. Young men have greater knowledge, high perception of action and the highest level of risk specification (alongside young women).

Consequently, to mobilize the high degree of constrained agency in these contexts necessitates response mechanisms (information and action) partially structured in response to central values (religion and nature) and experiences (failed actions and local developments such as agro-industrial pollution). Specifically, these response mechanisms should be cohort specific

because of the variability with which these contextual experiences and values, which supersedes resource gaps, structures knowledge, perception and agency for discrete populations. Religion, for instance, while primarily invoked in a form that is fixed for some in Flowers Bank (see Excerpt 63), functions more fluidly in other instances both in Flowers Bank and elsewhere (see Excerpts 63 and 64).

However, even in instances where religious fatalism is expressed with fixity, agency and action are not entirely precluded (see Excerpts 63 and 64). This suggests that religious fatalism is not always immutable; but even where mutability is operable, the scope for structuring perception of the efficacy of climate interventions and mobilizing agency towards such ends is restricted in accordance with pre-established convictions based on scriptural or biblical dictates and predictions. This means a religious frame offers circumscribed utility for efforts aimed at optimizing climate knowledge, agency and action in these contexts. While the variability with which religious values structures climate perception and permits actions is consistent with foundational tensions between science and religion that underpins religious environmentalism and climate change in particular, even within a common faith tradition (Kearns, 2011), it also clarifies the import of culture as an emergent and diffused thematic modality rather than an integrated whole with a personality writ large à la Benedict (1959, cited in Compton, 1980).

Specifically, the variation with which agency is constrained and/or permitted by the cultural and spiritual contents of religion runs counter to the view that culture necessarily hangs together distinctively, which precludes a holistic view to be discerned and used to craft the most effective messages. Rather, the data associated with the varying levels of agency among the religiously fatalistic and/or disposed in these natural resource-dependent contexts strongly supports Opler's (1945, cited in Compton, 1980) contention that culture is best understood when

its content (scriptures, dictates) is probed through principles or themes, such as a community or individual's relationship with the land. The efficacy of this thematic approach to understanding the enactment of cultural formations has clarified the differential prospects of using the religious frame to communicate climate change across and within cohorts and localities where it is significant. It has also been used to identify how nature-oriented fatalism expressed with varying degrees of certainties are amenable to substantial information provision over sustained periods, and associated actions.

The malleability of nature among some cohorts is typified by older women in San Miguel who privilege the problems caused by pigs and other wild animals over climate change, which they associate with normal weather variations, due to disproportionate knowledge deficits. However, in contexts such as Flowers Bank, where failed actions in seed and planting cycle experimentation functions alongside fixed and seemingly immutable fatalism, amidst informational deficits, response mechanisms that transcend information provision are necessitated. Addressing the failures in experimentation with seeds, planting cycles and efforts to limit soil erosion that have undermined climate agency warrants information, substantial financial, technical and other support mechanisms to have a positive structuring effect.

The uniformly positive knowledge-seeking disposition in the dataset that is more grounded than fatalism offers reinforcement for efforts to leverage these variably resonant secondary frames (nature and religion). The uniformly positive and dominant knowledge seeking disposition is likely a product of the discernibility of the signs and indicators of climate change, even amidst knowledge deficits. The implication is that an existential motive spurs a search for knowledge, which is consistent with the notable absence of elements of climate denialism. So, the common and heightened knowledge-seeking disposition discerned suggests that what

Lorenzoni, Nicholson-Cole and Whitmarsh's (2007) cite as individual level barriers to communicating climate change do not readily apply in highly collective resource-dependent contexts. Lorenzoni et. al (2007) note the trifecta of a lack of knowledge, lack of desire to find out information and a lack of locally and personally relevant and accessible information as key individual level barriers to communicating climate change. Whereas the maximal knowledge-seeking disposition counters criterion two, distinctions in engagement modalities and the significance of access, the nature and scope of even manifestly credible sources renders criteria one and three more socio-cultural and contextual determinants than individual factors.

Considering the substantial level of primarily constrained agency observed in the dataset amidst substantial resource gaps and the importance of motive for both enabling and mobilizing agency, the subsequent section probes what underscores the strong desire to act on climate change. Commonalities in risk perception and substantial collectivity even in risk specification, such as the shared engagement in farming for livelihoods, suggests an existential motive underpins the compelling knowledge seeking disposition and curiosity that marks the high resource gaps observed. However, motive is not dependent on knowledge (per Leiserowitz, 2003) and is substantially complex. Consistent with cultural and contextual distinctions, motive is likely underpinned by a multiplicity of factors, some of which are more germane to particular groups in certain localities. So, further clarity on the nature of this resilient motive to act on climate change amidst both capability and resource gaps will clarify another critical climate perception marker that can be used to (re)frame messaging and (re)formulate climate action, boost agency and action.

Excerpt 63: Religious Fatalism and Externalization of Cause are varyingly fixed with pre-defined mutability in accordance with scriptural/spiritual convictions.

Older Women Focus Group - Flowers Bank, CCCCC Subset
Interviewer: Do you think climate change is something we can do anything about? Respondent 1: No. I don't think so. Interviewer: You don't think so. Respondent 1: I don't think so. Interviewer: Why would you say no? Respondent 1: Because I would say… That's the good Lord's work. Interviewer: Do you think we can do anything about climate change? Respondent 2: I'd say [it] depends…maybe you can do things, maybe get lee [little] more comfortable. Depending on maybe erosion, like weh [what] she said [referring to Respondent 3] because they say the trees at the bank side help keep up the bank side. Sometimes the tree-- Respondent 1: People cut them down. Respondent 2: Yeah…people cut them down. Respondent 1: Sometime[s] they drop on their own. Respondent 5: Sometime[s] it go[es] in[to] the river by its own self. Respondent 3: Yeah…by itself. Interviewer: So, you [pointing at respondent 2] think there are things we can do to cope… Respondent 2: Yeah. Interviewer: But that's it? [Coping?]. Respondent 1: Somethings…somethings we could do. Interviewer: What about you? [Do] you think there is anything we can do about climate change? Respondent 3: I say we could plant more trees along the river side and stuff like that, but I no know if you could really do anything about that. Yeah, I think you could hardly do anything…because I…the climate changes…I think that's the good Lord's. […] Doing that. You can't change that. Interviewer: Can't change that! What do you think? Respondent 4: I think you can't do anything about that at all. Nature! Interviewer: Mhm. And do you think we can do anything about it? Respondent 5: No. Interviewer: Why? Respondent 5: Well, if God said something will happen; it will happen, no matter what we try. It still will happen. Interviewer: Aha. And Ms. [Respondent 6's name redacted]? Respondent 6: Well, there is certain things we can do. God say try and he will help. So no because [it is] God's work we give up. The [river] bank side, we know they will broke [sic] away. But, we could plant some more trees as [Respondent 3's name redacted] said and try to protect. Because sometime the reason why is because we cut the bush too much from the bank side. And the bank side [does] no have that support to hold [it together]. Once you cut the tree, the tree dies, the bank side just… erosion! So, there [are] somethings we could do and I say as God said, "try and he will help." If we, if because…I live at the river side. And I know if the river side…If I could do some more thing[s]…even they say you do Caving [protective rocks that are cemented to protect infrastructure] ... Like what you see them [the government] do… Respondent 2: By the bridge. Respondent 6: Or on the road going to Belize. Respondent 2: On the road with stone and thing…

Excerpt 64: Religious Fatalism expressed with greater fluidity and substantial receptivity to informational/knowledge enhancement

Young Women Focus Group – Trio, Ya'axché Subset
Interviewer: Do you think we can do anything about climate change? Why? Respondent 1: Well, I would say no because only God can deal with that. Respondent 2: I don't think so because it is not me who own this planet. Then it is God who do that. He is the one who is in charge of this and we are the same one who cause this, too, because… I hear right now, because we same people say that we are the same one is [sic] causing this season. I don't know, but we are burning the soil, or we are killing the soil and that is why when that evaporates it goes up and it come [sic] down again, it cause a lot of sickness that is what I hear.

Excerpt 65: A primarily biospheric fatalism expressed with less fixity than religious forms.

Young Men Focus Group - Flowers Bank, CCCCC Subset
Interviewer: […] Three of you tell me the village is affected by climate change? You're not sure [pointing at respondent], and [I would like to know,] do you think climate change is something you can do about?
Respondent 1: No. Nope.
Interviewer: You don't think so. Why do you say no?
Respondent 1: Because like…maybe it's like with the weather…mhm.
Interviewer: And you think it is out of your control. Do you think climate change is something we can do [anything] about?
Respondent 2: Nope.
Interviewer: No. Why?
Respondent 2: Because it's like the weather. We can't just control the weather.
Interviewer; Do you think climate change is something we can do [something] about?
Respondent 3: No, sir.
Interviewer: Why?
Respondent 3: Because we don't have no control over that.
Interviewer: Aright. Do you think that we could do something [about] climate change?
Respondent 4: No, sir.
Interviewer: Why do you say no?
Respondent 4: Because it's God work.
Interviewer: Because [of] what?
Respondent 4: It is God's work.

Motive for Action

Table 54: The relative prevalence of Intrinsic and extrinsic factors that motives climate action across study populations in Belize

Subset	Village	Children		Community/ Village		God/ Religion		Self/ Offspring		World		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Ya'axché	Indian Creek	1	33%	2	67%	0	0%	0	0%	0	0%	3
	San Miguel	0	0%	0	0%	0	0%	0	0%	0	0%	0
	Trio	1	7%	8	53%	2	13%	4	27%	0	0%	15
CCCCC	Flowers Bank	0	0%	7	37%	5	26%	3	16%	4	21%	19
Totals		2	5%	17	46%	7	19%	7	19%	4	11%	37

Overall, five of the six codes indicating motive for acting on climate change are varyingly active in the dataset: four in each subset but none in San Miguel and only two in Indian Creek (see Table 54). Community/Village is the most grounded motive for acting on climate change (46 percent), which is consistent with the dominant perception of shared or equal risk perception. While this holds true across all the villages where this theme registers, the collective motive only accounts for a greater prevalence in Indian Creek (two-thirds) and Trio (53 percent). In Flowers Bank, the localized communal motive only accounts for more than one-third of prevalence (37 percent). However, the village also accounts for the totality of prevalence

associated with preserving “the world” (21 percent), which is a broader communal motive that when considered alongside the narrower conception that figures elsewhere brings it in line with the general communal disposition that underpins the drive to learn more and act on climate change across study populations (58 percent).

God/Religion and Self/Offspring are the second most grounded motives for action with equal levels of prevalence overall (19 percent each). However, they only register in two circumscribed localities: Trio and Flowers Bank. In both contexts, these motives register with differing resonance. God/Religion accounts for twice as much relative prevalence (26 percent) in Flowers Bank than Trio. This is consistent with the high level of fatalism, particularly religious fatalism, observed in Flowers Bank. The gap in resonance for self/offspring is smaller: 27 percent in Trio and 16 percent in Flowers Bank. The high level of localized/self motive in both contexts is consistent with the tendency to distribute climate risk in these localities and the factors underlying these distributions. Specifically, the emphasis on specified groups, namely farmer’s in Trio and Indian Creek (see Excerpts 59, 60 and 63) and folks who precariously live on the banks of the Belize River that traverse the heart of Flowers Bank. Children, the only other factor denoting motive for acting on climate change to register in the dataset, is observed in singular instances in Indian Creek and Trio with vastly different levels of resonance (a third and seven percent, respectively). While motive for San Miguel village is not discernible from the dataset, the shared communal risk perception across villages and the shared communal motive observed strongly suggest this village, which maximally perceived climate risk as equal, also has a primarily communal motive to act. Gender and age strongly correlate with discrete motives for action. Older women are the only cohort whose motive for action is not communal. Community/village, the only explicit communal marker that registers for the cohort, accounts for

13 percent of prevalence for motive for action for the cohort. Even with the inclusion of children, which the cohort entirely accounts for, older women's communal tendency peaks at 38 percent. This contrasts with 60 percent for young women, 58 percent for older men (68 percent when broadened to include the world, an even more manifestly communal measure) and 40 percent for young men (80 percent when broadened to include the world).

Rather than a communal motive for action, it is religion that underscores action among older women, accounting for 50 percent of the prevalence for this measure. This motive is largely expressed in terms of coping in anticipation of the inevitable, which is consistent with the high degree of fatalism, especially religious fatalism, noted among older women (see Excerpt 63). However, this religious motive among older women is unique to the women in Flowers Bank, where it accounts for 90 percent of the cohort's motive for action. The data signals that older women elsewhere (the Ya'axché subset) are as communal as all other cohorts across villages, accounting for the totality of prevalence for children in the dataset, which represents two-thirds of prevalence for motive for action for the cohort in the Ya'axché subset. Furthermore, the religious motive is consistent with the relatively higher level of religious oriented fatalism among this cohort. It is also noteworthy that men from Flowers Bank account for the totality of prevalence associated with the world and this is equally accounted for across age cohorts, but with varying resonance (40 percent for the more communal young men and a tenth for older men).

Consistent with the observation that men are more likely to specify groups as being more vulnerable, particularly farmers, an activity they are customarily charged with, they account for the majority of prevalence associated with self/offspring as a motive for action (71 percent). However, the self-motive is not gendered. As shown in Excerpt 66, it is primarily invoked in

relation to the disproportionate risks climate change variability pose to individual and collective farming pursuits and the food security implications for primarily subsisting families. The likely non-determinative nature of gender in expressed self-motive is underscored by the fact that it accounts for a similar level of prevalence among older men and young women (26 percent and 20 percent, respectively). Unlike older men, young men registered no self-motive and older women only registered 13 percent. The implication is that although the dominant perception of equal risk is a central frame through which climate response mechanisms in these contexts ought to be framed, there is a multiplicity of fundamental, contextually distinct and culturally defined motives of varying import to different cohorts across villages. The multiplicity of motives is consistent with observations in the extant literature that environmental behaviours and attitudes are variably determined. However, rather than human progeny as the primary motive, as Maibach, Roser-Renouf & Leiserowitz (2008) established from their review of the literature, it is a primarily and decisively socio-tropic motive (per shared risk disposition, the communal motive and the shared exposure evident even in the most heightened form of specification – farmers) that is most significant in indigenous and traditional contexts studied across Belize.

So marginal is human progeny as a motive that explicit concern about children only features in two of the seven instances in which self/offspring registered prevalence as a primary motive (once among older men in Flowers Bank and older women in Trio). This manifest socio-tropic altruism also comports with the high resonance of biospheric values (concern about nature) in the dataset and the general integrative and holistic framework that underpins indigenous and traditional knowledge and culture. As established in the analysis of religious cause and proximity, in a holistic cultural domain, the meaning of the lifeworld and its varied facets are defined by contextual usage with full recognition of their interdependence, organic and

cyclical nature. As such, “native people imagine the world (natural and supernatural, mundane and magical) as balanced, alive and ever changing” (Riley, 2000, p. 196).

Considering the differing permeability/mutability of socio-cultural and environmental factors explicitly undermining climate change agency, the effectiveness of climate response mechanisms will vary across contexts and cohorts. This is particularly likely on measures of message reception, motive and action where the scope of change proposed by climate interventions conflicts with the restricted scope permitted by some culturally and spiritually bounded motives and biospheric perceptual frameworks around which climate agency is cultivated and must be mobilized. This means tapping the high degree of constrained agency observed to enable effective climate action will require multi-scale and differential response mechanisms at both population and cohort levels to attenuate the socio-cultural and environmental limits to climate action.

The identification of highly operable socio-cultural and environmental limits to climate action with varying mutability across cohorts and contexts supports conceptual articulations about the import of socio-cultural limits to adaptation (Adger et al., 2008; Moser, 2010). Having identified these overall and discretely significant motives, the identification of appropriate champions and leaders is of critical import for effectively mobilizing them for information provision and associative actions that boost and operationalize climate knowledge and agency for effective climate action.

Delineating leadership patterns in these contexts is of high import given the emphasis on foregrounding local actors to engender citizenship, achieve genuinely participatory and empowering interventions (Holland, Brockles, Abugre, 2004; Pratt, 2003), the limited reach of the engagement in the Ya’axché subset and the need to mobilize and edify residents about the

climate change aspects of the CCCCC-led intervention in Flowers Bank. Accordingly, the subsequent section probes how and where confidence is reposed for climate leadership, with particular attention to perceptions of internal leadership given the high overall collective risk perception and motive for action, alongside intractable resource gaps.

Excerpt 66: Self Motive: Self/Motive expressed through food security frames, as well as, individual and collective pursuit of farming drives support for engagement and support of climate-smart actions

Older Men Cocoa Group Focus Group- Trio, Ya'axché Subset
Interviewer: […] Why [is] the concession area is so important? [Referencing the community management of a major conservation area.] Respondent 1: Well to me the concession area is very important because we found it is not trust age. We as individual[s], we as [a] group, we came up with this idea as the story being told. We are landless people, and we came up with this idea. Hey, we can't go to the Government to fight for a piece of land and we talk to ourselves: what can we do? We know the area well and we saw that the area have [sic], already have [sic] cocoa in it, in the wild cocoa growing freely on its own. The nature took care of that and we say [sic] let's take advantage of it; let's form a model and put it in writing that we want to do organic cocoa, so the concession is very important because it is a milestone of an achievement for this group. For this community, it is a start! It is the beginning, [a] start to show that, yes, with the people that have the understanding and the will of carrying this project until it reaches it[s] max, to show the rest of the country that hey! That we can do this, and we can be a part of climate change by doing this that we said we are doing. Yes, it is important! The piece of land where all of us members will benefit, hence the reason we take care of it [be]cause we know the importance. It's the treasure that are [sic] there; the reason of the importance of the concession. Respondent 2: Well, it the same like how he was saying because without that how would we help ourself and like how we are saying we have to have our food. Like how I am seeing now on how to plant and to plant different plants and we are working and we are helping for not doing harmful things. Like with the climate change. Well, we should ease down on doing it and that is important Respondent 3: For me it is important for me because for working in unity and help each other and to give us an income in our family. Respondent 4: Well, they are saying that is where or how we help our family and that the chemicals smell very bad, but before I use chemical but now when I go in the banana farm I get headache and that is how I know that using chemicals is not good that is it for me.

Climate Leadership

Table 55: The relative prevalence of preferred sources of climate leadership across study populations in Belize

Subset	Village	Community/ Village		Elders		Exemplary Group		Exemplary Person		External		Teachers		Traditional Structures		Youth		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Ya'axché	Indian Creek	2	8%	7	27%	0	0%	0	0%	8	31%	0	0%	9	35%	0	0%	26
	San Miguel	0	0%	0	0%	0	0%	4	57%	3	43%	0	0%	0	0%	0	0%	7
	Trio	8	38%	0	0%	2	10%	0	0%	7	33%	0	0%	4	19%	0	0%	21
CCCCC	Flowers Bank	7	35%	0	0%	0	0%	0	0%	5	25%	1	5%	4	20%	3	15%	20
Totals		17	23%	7	9%	2	3%	4	5%	23	31%	1	1%	17	23%	3	4%	74

Six of the codes associated with climate change leadership are active varyingly in the dataset: four in the Ya'axché subset and five in Flowers Bank (see Table 55). Overall, external leadership is preferred, accounting for nearly one-third (31 percent) of the prevalence for climate leadership, while traditional structures and community/village level leadership round-out the top three with 23 percent each. All other sources of leadership evident in the dataset account for less

than a tenth of prevalence overall. The substantial outward look for climate leadership is consistent with the high degree of resource gaps, largely ideational, noted earlier. While it ranks first overall, none of these traditional contexts have accorded external leadership the first rank in terms of prevalence, which suggests a strong communal disposition still structures their preferred approach to problem-solving.

While not explicitly discernible from the data, the endogenous origin of both interventions is also likely structuring perceptions of ownership that constrains decisive externalization even amidst internal deficiencies. This is consistent with rights-based perspectives on participation in development that suggests meaningful engagement in processes to tackle local challenges through dialogue, collaboration and practice broadens people's perception and appreciation of power and influence in priority-setting (Thomas, 2008). But it is significant that the preference for external leadership ranks second in terms of prevalence in every village, with San Miguel being most predisposed to external leadership (43 percent) and Flowers Bank being least predisposed (25 percent). San Miguel is especially noteworthy as it is the only sample population that is entirely comprised of older men and older women, who would define the traditional structures, but they show no deference towards it as "exemplary persons" of any origin account for the remainder (majority) of prevalence associated with their assertions on climate leadership. However, the higher level of climate agency (mixed and explicit), due to belated external action that comports with the range of impacts discerned, is the likely explanatory factor for the higher explicit preference for external leadership in this highly communal context (see Excerpt 67). The higher tendency to repose confidence in external leadership for climate action is also consistent with the village's distinction as the least knowledgeable.

In the other villages, external leadership is resolutely lower. It accounts for comparable levels of prevalence in both Indian Creek and Trio (31 percent and one-third, respectively). Overall, San Miguel is the only village where total prevalence for codes associated with explicit internal/local leadership doesn't register and therefore doesn't account for a majority of prevalence. All other villages, while highly interested in external leadership as detailed above, prefer some combination of local leadership: a total of three-quarters in Flowers Bank (community/village – 35 percent, traditional structures – 20 percent, teachers – five percent and youth – 15 percent; 70 percent in Indian Creek (traditional strictures – 35 percent, community/village – eight percent and elders – 27 percent; and two-thirds in Trio (community/village – 38 percent, traditional structures – 19 percent and Exemplary group/the cocoa group – 10 percent).

A variety of factors account for the varying degrees of preferences for communal leadership among the other villages (Flowers Bank, Trio and Indian Creek). In Flowers Bank, where no climate action is perceived by the population, the locality's distinction as having the least preference for external leadership is consistent with it having the lowest level of agency and highest level of fatalism, particularly of a religious orientation with limited malleability (see Excerpt 63). This perception of limited pathways for action, as well as substantial premium climate knowledge, is likely to attenuate the desire to seek external support to enact responses, which they faultily do not now discern. Relatedly, the village is distinct relative to others in the dataset for having an active community group with population-level membership and a record of collectively tackling community crises—specifically, using cohune oil production as an effective safety net following the closure of the neighbouring Williamson Clothing Factory, a key source of employment.

Excerpt 67: Substantial direct engagement heightens explicit preference for external leadership on climate action

Older Men Focus Group - San Miguel, Ya'axché, Subset
Interviewer: If you had suggestions, do you think Ya'axché would [they] listen? Like, if you say… If they make a suggestion, or they want to do something, and you say: I want to do it a little more differently, would they listen? Respondent 1: I think yes, because we are working together. Well, like I said: it's not with money but like with help. Respondent 2: Like how they take we [sic] for training to Honduras for us to see those people and for us to do the same for ours. Interviewer: So, you all want to learn more about climate change and you all have some ideas about it [Referencing earlier declaration of a knowledge seeking disposition and agreed knowledge limitations]. Who in the village [do] you believe should lead to get you to learn more and do some more stuff on climate change? Respondent 1: It will be good through Ya'axché. Like how technical people come to tell us and to come and visit our farm [and] teach us. Respondent 2: Same thing. Respondent 3: Same thing.

Excerpt 68: Sustained and focused practical engagement engenders confidence in local capacity to lead on climate change

Older Men Cocoa Group Focus Group – Trio, Ya'axché Subset
Interviewer: Who [do] you think should lead; to get more done in the community with climate change? Respondent 1: Well, like for me, like us. We are getting a little bit of knowledge and knowing about climate change. It is very important to do it and in giving others knowledge of what we know. Respondent 2: In my opinion, it should be a collective group. I don't think it is a good idea of climate change only affect one. It will affect us [all]. The point that I am trying to say is that this group is [to] inform of climate change and to implement it, and I feel like it is us who is causing it. Respondent 3: I think by our self that we should think who would want to lead. Respondent 4: Well, I think that we should learn from each other we should see if they are doing good or not, so we can follow the good things […]. Respondent 5: I think individually because if we wait for someone that will not happen.

While both Indian Creek (70 percent) and Trio (67 percent) exhibit near identical levels of preference for communal leadership, the slightly higher preference for communal leadership in Indian Creek is likely a function of a higher communal motive for action (67 percent compared to 53 percent). This is supported by the fact that while they report comparable levels of climate agency and Trio reports higher levels of premium climate knowledge, as well as lower levels of resource gaps, Indian Creek reports a higher level of discernible actions that is of a more recent nature than Trio. The implication is that the perceptibility of a wider range of practical climate action, particularly in a context where there is a higher level of communal motive to act and the impacts perceived are greater, engenders greater confidence in the localized collective order.

However, the nature of the local order in which confidence is reposed is dependent on the range of organizational structures available (see Excerpt 68). So, Trio more readily reposes confidence outside of traditional structures and elders as is the case in Indian Creek. This is so as

Trio is distinct for having a specialist group of cocoa and coffee farmers with widely acknowledged knowledge advantages and Ya'axché's focused and practical engagement with both members and non-members of the group is most sustained and comprehensive. Taken alongside the significance of the Flowers Bank Community Group in that locality's internal confidence to manage climate change, new forms of local institutions (population level, specialist and perhaps cohort and gendered) with proven capabilities are likely critical mechanisms through which the substantial levels of constrained agency observed can be mobilized. Nevertheless, the importance of the traditional order across these villages and maintaining harmony in small and collective contexts, where both motive and risk perception are primarily shared, requires bridging structures to ensure new institutional formations are perceived and function as enhancing mechanisms rather than usurping existing power structures and roles. These bridging structures are of central importance given the heightened levels of contestations and fears about property rights due to the constitutional guarantees secured by mobilized activists (extra-traditional leadership) through robust advocacy and legal challenges (see Excerpt 72). The fissures in the social order caused by extra-traditional leadership and institutions underscore what Baer (2007) and Neumayer (2007) see as the limits of using a techno-economistic calculus to tackle a challenge with pervasive externalities.

By excluding, usurping and/or undervaluing the import of the socio-cultural and environmental because of perceived and manifest incapacitations, particularly identity affirming traditional leadership structures and knowledge forms, the techno-economistic calculus functions counterproductively. It exacerbates the weaknesses within the traditional order, the most unifying and legitimate internal mechanism for the mobilization of internal agency in these collective contexts. So bridging structures between new institutional mechanisms and traditional

structures that allow the former to complement the latter is likely to enhance the vital collective order and thereby simultaneously clarify and strategically address "conceptual, ethical and practical reservations about how non-market impacts [e.g attrition in confidence toward the communal and traditional]" should be factored into techno-economistic assessments (Stern, 2006, p. 187).

Despite the overall tendency to repose climate leadership in discrete local domains, the high degree of resource gaps, particularly ideational shortcomings, seems to undermine traditional structures as the preferred route for leadership and effective action. Traditional structures only rank first in terms of preferred sources of climate change leadership in Indian Creek, where it accounts for 35 percent of prevalence. It is instructive to note that even in this context, where leadership through traditional structures is articulated deferentially, respondents have distinguished between reposing leadership in "elders" from the Alcalde, the established/defined traditional authority (see Excerpt 69). Even in Flowers Bank, the village most committed to reposing climate leadership in discrete local domains, traditional structures (age-based in this context) only account for a fifth of prevalence, well behind community at 35 percent and marginally higher than youth (15 percent - see Excerpt 71). A similar pattern is observed in Trio, where traditional structures (Alcalde) account for 19 percent of prevalence and broader community/village action is most preferred (38 percent) alongside the locally identified exemplary group (cocoa group - 10 percent).

Overall, this suggests climate leadership is highly contextual, in terms of institutional capacity, cultural structures and dispositions and is impacted by ideational levels. Distinctions in leadership preferences across cohorts generally and distinctions among some cohorts in circumscribed localities reinforce these observations. Such distinctions reinforce a need for

climate champions of various forms (local and external) for the effective provision of climate information and enactment/demonstration of associated actions aimed at both population and cohort levels across villages. Specifically, all groups, except older men, overwhelmingly prefer internal/local leadership: young women maximally favour internal leadership (traditional structures (44 percent), elders (22 percent), community/village and youth (17 percent each); for young men these structures account for 71 percent of preference (traditional structures (57 percent) and community (14 percent)); and nearly half for older women (46 percent - traditional structures, community/village and teachers (eight percent each) and elders at 23 percent).

However, there's significant preference for an indeterminate group of exemplary persons (31 percent) among older women that even if largely external will still not change the overall dominance of internal preferences for the cohort. The high level of support for experts among older women irrespective of their origin, which is entirely accounted for by older women from San Miguel, is likely due to their disproportionate knowledge deficit. The implication is that heightened levels of knowledge deficits in a communal context attenuates confidence in internal and more so traditional structures such that older women in San Miguel, where direct engagement of the cohort is absent, exhibit the lowest communal motive of all cohorts and singularly account for all references to indeterminate excerpts (see Excerpt 70; also see Young Women in Flowers Bank (Excerpt 71) for the countervailing case).

The leadership preferences of older men are also supportive of the observation that overall internal knowledge and broader resource gaps undermine confidence in the traditional order. Older men, who are most widely engaged and knowledgeable, are the most committed to seeking external leadership (55 percent) and registered no preference for traditional structures or elders, which are categories within which they are represented and hold power. Where local

leadership is preferred by this cohort it is largely reposed in the community-at-large (38 percent) and secondarily to exemplary groups in the case of Trio (see Excerpt 68). So, the core cohort level distinctions in preference for climate leadership are consistent with the overall observation of the role of ideational exposure, contextual factors, institutional capacity and practical engagement in structuring leadership preference for climate action.

Both young women and young men prefer to repose leadership in internal structures (83 percent and 71 percent, respectively). Young women's higher preference for internal structures is likely a result of their higher level of collective motive and the relative malleability of the primarily informational resource gaps that undermine their agency. So positively primed and disposed to act on climate change are young women that the cohort, entirely associated with Flowers Bank, self-identifies their demographic (youth) as a possible source of climate change leadership due to their perceived relative educational advantages (see Excerpt 71). As previously established, young men, who are similarly knowledgeable and engaged as young women, are more prone to risk specification and exhibit high levels of fatalism of a naturistic or biospheric orientation. Further, young men perceive a wider-range of climate responses associated with the Ya'axché intervention than young women, while perceiving the same level of impact. The implication is that young men, who are not directly engaged and aware of the nuances of the intervention and are less collectively motivated, more readily externalize leadership preference based on perceived efficacy of the intervention's mechanism which comports more favourably with the scale of impacts they perceive. Considering the high and comparable salience of formal education as a knowledge acquisition source for both cohorts of youth (79 percent for young men and 80 percent for young women), the divergence in leadership preferences, alongside wider cohort-level distinctions associated with practical engagement, experimentation, institutional

capacity and other factors, suggests Korma's assertion that "book knowledge and schooling undermine[s] the appreciation of practical indigenous knowledge" (1995, cited in Kohler-Rollefson, 1996, p. 11) is likely overdetermined. Rather, waning confidence in prevailing indigenous knowledge forms and leadership within these contexts is chiefly structured by the incapacitation of existing knowledge accrued through indigenous experimentation to tackle distal observations and challenges. In lieu, confidence correlates with exposure to new formal and informal experimental knowledge systems, new internal institutional mechanisms interfacing with external actors and systems.

The continued relevance of experimentation as a factor in this emergent integrative knowledge order underscores Showers (1996) contention that there is limited utility in separating conceptions of indigenous knowledge and scientific knowledge for environmental researchers, particularly those committed to using ethnoscientific techniques to improve the design and communication of interventions to address unprecedented geologic change. The integrative nature of the emergent knowledge system is a critical manifestation of the purpose of the bridging structures necessitated to offset fissures in the crucial collective order.

Excerpt 69: Preference for traditional leadership is deferentially articulated

Young Women Focus Group – Indian Creek, Ya'axché Subset
Interviewer: So, you want to learn more and most of you think that your village might be affected in the future. Who in the village should get you to learn more about climate change? Respondent 1: I would say the village leaders, like the Alcalde, the chairman and especially the school. Respondent 2: I would say the same thing and some of the elderly people too Respondent 3: Same thing. Respondent 4: It's [true]. We have to come together. Respondent 5: same thing. Respondent 6: same thing. Interviewer: Why should those people lead? Why should the Alcalde [and] the elders lead? Respondent 1: Because [they] are in charge of the village. Like the chairman, the Alcalde… they are the one[s] that are going to do this. They are the one[s] to gather people and to have meeting[s] with them. Respondent 2: They can find other ways. They can do it. The chairman, the village leaders, taking charge, we can try to find solution on how we can prevent the climate change.

Excerpt 70: Disproportionate knowledge and broader resource deficits heightens support for experts irrespective of origin among older women

Older Women Focus Group - San Miguel, Ya'axché Subset
Interviewer: Would you like to learn more about climate change? Why do [you] want to know more? Respondent 1: Yes, for us to know. I want to know because I don't know. Respondent 2: We hear about it. I want to know more about the climate change.

Respondent 3: Same thing.
Respondent 4: Yes! I want to know more.
Interviewer: So, you want to know more about this climate change thing. Who in the village [do] you think should […] get you to learn some more? From the village or outside the village?
Respondent 1: I don't know. Who knows about it for them to explain to us. Whoever from the village or from the outside.
Respondent 2: Same thing.
Respondent 3: But how they will [sic] find out [about] the climate change? Through computer or through internet?
Respondent 4: I don't know.
Respondent 5: I think anybody [who knows].

Excerpt 71: Young women self-identify as potential climate leaders due to perceived educational, informational and technological advantages.

Young Women Focus Group - Flowers Bank, CCCCC Subset

Interviewer: So, most of you think climate change is affecting the village. And, you've said that you want to learn more. And you said that there is no climate change project happening in the village. If we were to do something about climate change in the village, who do you think should lead on that from Flowers Bank? Who should lead?
Respondent 1: I would say the youths [sic].
Interviewer: The youths [sic]. Why the youths [sic]?
Respondent 1: […] If we could get them at that age to cut it then as we go further, they can pass it down their own kids.
Interviewer: Why do you think young people.can the youth contribute to climate change?
Respondent 1: I would because they don't know.
Interviewer: Because they don't know. OK. And who [do] you think should lead?
Respondent 2: The Chairman [of the village].
Interviewer: The Chairman. Why the Chairman?
Respondent 2: Because he is more than likely the leader of the community.
Interviewer: He is the leader. OK. Who do you think…?
Respondent 3: I share the same sentiments with her [referring to respondent 1] because for the youths [sic], for me, I believe that they are more aware because they are more in tuned with technology and the older folks they need to come around in terms of inviting them on the effects of climate change.
Interviewer: And who do you think should lead?
Respondent 4: OK. I say the youths [sic], too, because the youth they really… Because you learn, they think[s] in school and the youths [sic] [are] more knowledgeable. Like Ms. [name of respondent 3 redacted] said, the technologies, the internet and all [of] that.
Interviewer: Is there a youth group in the village?
Respondents 1 & 3: No.

Angst

Table 56: The relative prevalence of the range of ranked and unranked complex concerns across study populations in Belize

Subset	Village	Afforestation		CC Impact		CC Impact - 1		Chemical Use/ Industrial Activity		Electricity		Electricity -1		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Ya'axché	Indian Creek	1	3%	0	0%	6	15%	0	0%	6	15%	4	10%	39
	San Miguel	0	0%	0	0%	2	22%	0	0%	0	0%	0	0%	9
	Trio	2	4%	1	2%	9	17%	2	4%	0	0%	0	0%	52
CCCCC	Flowers Bank	0	0%	5	13%	7	18%	0	0%	0	0%	0	0%	40
Totals		3	2%	6	4%	24	17%	2	1%	6	4%	4	3%	140

Subset	Village	Flooding		Flooding -1		Food Security		Health Centre		Health Centre - 1		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Ya'axché	Indian Creek	0	0%	0	0%	1	3%	0	0%	0	0%	39
	San Miguel	0	0%	0	0%	0	0%	0	0%	0	0%	9
	Trio	0	0%	0	0%	3	6%	3	6%	3	6%	52
CCCCC	Flowers Bank	2	5%	1	3%	0	0%	0	0%	0	0%	40
Totals		2	1%	1	1%	4	3%	3	2%	3	2%	140

Subset	Village	Income		Income - 1		Land Rights		Land Rights - 1		Leadership and Harmony		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Ya'axché	Indian Creek	0	0%	0	0%	0	0%	0	0%	6	15%	39
	San Miguel	0	0%	0	0%	1	11%	2	22%	0	0%	9
	Trio	4	8%	2	4%	0	0%	0	0%	8	15%	52
CCCCC	Flowers Bank	1	3%	0	0%	0	0%	0	0%	6	15%	40
Totals		5	4%	2	1%	1	1%	2	1%	20	14%	140

Subset	Village	Leadership and Harmony - 1		Lifestyle		Poverty		Road		Sanitation		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Ya'axché	Indian Creek	0	0%	0	0%	1	3%	0	0%	8	21%	39
	San Miguel	0	0%	0	0%	0	0%	0	0%	0	0%	9
	Trio	7	13%	1	2%	0	0%	2	4%	5	10%	52
CCCCC	Flowers Bank	2	5%	0	0%	0	0%	4	10%	1	3%	40
Totals		9	6%	1	1%	1	1%	6	4%	14	10%	140

Subset	Village	Sanitation -1		Transport		Transport -1		Wild Animals		Wild Animals -1		Density
		Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	Prev	Rate	
Ya'axché	Indian Creek	6	15%	0	0%	0	0%	0	0%	0	0%	39
	San Miguel	0	0%	0	0%	0	0%	2	22%	2	22%	9
	Trio	0	0%	0	0%	0	0%	0	0%	0	0%	52
CCCCC	Flowers Bank	0	0%	8	20%	3	8%	0	0%	0	0%	40
Totals		6	4%	8	6%	3	2%	2	1%	2	1%	140

Multiple distinctions in leadership preferences and their association with contextual factors such as institutional capacity, cultural structures and dispositions, alongside population and cohort-level distinctions in perception of impacts, action and cause, mean the efficacy of mechanisms to mobilize agency and enable effective action in these primarily collective contexts is dependent on accounting for the complexity and linkages among a broad array of issues and the intensity with which they are perceived across populations in both messaging and actions. While the most pronounced resource gaps undermining agency and confidence in the traditional order to lead climate action are informational, a range of multi-linked and cross-sectoral first-order concerns constrains the minds of the study population. These inter-linked angsts, which are

both manifestly and latently caused and/or exacerbated by climate change and variability, are variably understood, but especially intractable among this study population.

Per Table 56, 26 of the 55 codes denoting angst are active in the overall Belize dataset, a level only exceeded by the larger Indian dataset (35; and just 10 for Fiji). Specifically, there are 11 angsts associated with Flowers Bank and 15 varyingly in the Ya'axché subset – 14 in Trio, nine in Indian Creek and five in San Miguel. However, some fundamental concerns which have no clear connection with climate change warrant careful attention because attending to them strengthens critical contextual leverage points for boosting and mobilizing agency and action. For instance, overall, Leadership and Harmony is the most grounded angst discernible from the dataset as a singularly mentioned or unranked concern (17 percent). The high level of prevalence associated with concern about Leadership and Harmony is likely consequential for the mobilization of agency, particularly the substantial level of constrained agency observed, given the high degree of collectivity and interdependence of these physically small, socio-culturally and existentially interdependent contexts. However, the heightened concern about leadership and harmony is consistent with observations of shifting confidence in leadership for addressing climate change impacts from traditional structures to non-traditional groups, exemplary persons and even the general community level, even where local leadership is preferred.

Moreover, the attrition in confidence reposed in the traditional order, which manifests in concerns about leadership and harmony, is also due to broader socio-legal developments and economic interests, namely contestations about the pursuit of collective or individual land rights. Following nearly a decade of legal challenges, the Belize Supreme Court issued a landmark decision affirming the customary land rights of 39 Maya communities in southern Belize, which

was upheld by the final court of appeal (The Maya Leaders Alliance v. The Attorney General of Belize, 2015). The judicial decision grants the communities full rights over their ancestral lands, which have been serially encroached upon by the post-colonial Belizean state for resource extraction and land privatization for other commercial interests that have resulted in warnings from the United Nations Committee on the Elimination of Racial Discrimination (DeLuca, 2015). However, differing positions across Mayan communities means support for enacting these constitutional rights sought by the Maya Leaders Alliance and the Toledo Alcaldes Association and especially vocal activists have caused fissures in the communal order and undermined confidence in traditional structures. The data associated with this measure suggests differences in economic outlook and current private ownership of land generally undermine support for collective ownership and confidence in leadership (see Excerpt 72). This is further underscored by the fact that leadership and harmony account for the greatest level of prevalence as a ranked concern in Trio, where the individual pursuit of the commercially lucrative agro-forestry activities is most comprehensive and long-standing. This suggests a strong correlation between ownership and successful mobilization of agricultural land and concern about the state of the collective order as customary ownership patterns are championed by traditional structures and much of the population.

However, it is noteworthy that Flowers Bank, a Creole community that does not benefit from the landmark legislation, is equally concerned about leadership and harmony (unranked) as the Mayan villages. However, this primarily concerns mobilizing support for community events (see Excerpt 73). Nonetheless, this offers strong reinforcement of observations in the previous subsection about the importance of attending to the socio-cultural in order to effectively understand how climate impacts and responses are likely to manifest subjectively across

localities and cohorts and constrain climate adaptation efforts, particularly in contexts of holistic belief systems where place and culture are germane.

While Leadership and Harmony is the most grounded singularly mentioned angsts, at a comparative level, Climate Change Impact ranks first in the overall dataset with a slightly higher prevalence of 20 percent. This is significant as it suggests a heightened sensitivity to the significant impact of climate change in the localities and the extent to which concerns/angsts are viewed as being climate change induced, related or exacerbated. This is supported by the fact that the only singularly mentioned angst that accounts for more than a tenth of prevalence, Sanitation (12 percent or 14 of 120), is only ranked as a primary angst in one locality and accounts for overall prevalence of five percent (six of 120). Furthermore, land rights are the only angst other than Climate Change Impact that register higher levels of prevalence when ranked against Climate Change Impact (0.8 percent or one of 120 to 1.7 percent or two of 120) and this is entirely accounted for by older men in San Miguel (see Excerpt 72). All other angsts that registered in the dataset had lower levels of resonance when ranked against climate change impact, except Health Centre and Wild Animals that maintained the same level of resonance when ranked (three of 120 and two of 120 each).

Furthermore, both angsts are also entirely accounted for by particular cohorts in circumscribed localities (older men in Trio and older women in San Miguel, respectively). A more granular look at the prevalence of angsts underscores this observation. Even where contextual factors invariably drive the articulation of primary angst (Sanitation in Indian Creek (eight of 39), Wild Animals in San Miguel (two of nine), Leadership and Harmony (eight of nine) in Trio and Transport in Flowers Bank (eight of 40)), climate change impact is the only ranked factor to account for a greater share of prevalence for angst in the particular populations.

In Indian Creek, where climate change impact isn't mentioned as an independent angst, it accounts for 15 percent of total prevalence for angsts in the locality as a ranked concern, a figure which is only equalled by sanitation as a ranked factor (sanitation-1). However, sanitation, which is the top-ranked angst as a singularly mentioned concern, declined in prevalence by more than five percent when compared to climate change (21 percent). This decline in prevalence is also observed for electricity and leadership and harmony at an even more significant scale. Both factors moved from prevalence of 15 percent to 10 percent and 15 to zero, respectively, when ranked against climate change.

A similar pattern is observed in Flowers Bank, where the highest concentration of singularly ranked factors registered prevalence as a comparative factor (flooding, income, leadership and harmony and transportation). Flooding lost half its salience when ranked against climate change (from five percent to 2.5 percent); leadership and harmony lost two-thirds (from 15 percent to five percent); transport lost 60 percent (20 percent to of eight percent), while sanitation and income lost the entirety of their prevalence (2.5 percent to zero). This is significant as climate change is independently mentioned as a factor with less prevalence (13 percent) than both leadership and harmony and sanitation but rose by five percent (18 percent) when ranked against the other angsts. This is consistent with the village's relatively high level of premium climate knowledge (second in the dataset) and the lowest level of knowledge gap, measures on which Indian Creek is outranked by all villages except San Miguel. The shift in the relative rank of angsts in Flowers Bank, particularly flooding in favour of climate impact, is illustrative of its comparative knowledge advantages being operationalized. The heightened level of angsts about climate change as both a singularly mentioned and ranked concern in this locality, which is greater than all other villages, also comports with the village's high perception

of impact (second only to Trio), but inability to discern any response mechanism. The heightened level of angsts is also consistent with Flowers Banks disproportionate and distinctly religious fatalism and externalization of cause to domains outside of human reach that implies end times or irreversible resource exhaustion, respectively.

Both Trio and San Miguel show marginal variations to the trend of increased concern about climate impact when ranked. In Trio, four singularly mentioned factors are ranked, three of which decline in resonance sanitation by 100 percent (from 10 percent to zero); specifically, income by 50 percent (from eight percent to four percent), leadership and harmony by two percent (from 15 percent to 13 percent). However, health centre maintained the same level of prevalence when ranked (eight percent). Overall, climate change's resonance as an angst shifted from prevalence of two percent to 17 percent when compared. This 15 percent shift in resonance when ranked makes climate change the single most grounded angst for the village overall—unlike any other context in the study population. This high level of consciousness about the primacy of climate impact, which is second only to Flowers Bank, is consistent with Trio's top rank for premium climate knowledge and lower levels of climate gap (second only to Flowers Bank), and the highest level of perceived impacts.

Conversely, San Miguel, where both climate knowledge and perception of impact (alongside Indian Creek for the latter) are the lowest, is the only context where there is no decisive shift towards privileging climate change impact as an angst when the issue is invoked comparatively. Two singularly mentioned factors account for prevalence when ranked against climate change: land rights (11 percent) and wild animals (22 percent). Wild animals maintain the same level of angsts and land rights doubles its prevalence. However, climate change shifts from prevalence of zero of nine to two of nine. While this trend comports with the village's

relative knowledge deficiencies, it also reflects elements of the traditional order's (elders due to the sample distinction) specific and heightened concern about the most significant socio-legal and customary challenge facing Mayan communities across southern Belize today: internal contestations about enacting customary land rights (see Excerpt 72).

While the shifts observed are indicative of both contextual factors and knowledge operationalization challenges, that CC-Impact when invoked as a ranking factor is so resonant it ranks as a first-tier concern in all villages alongside their other primary expressions of angsts strongly suggests that climate change's multidimensionality is substantially understood, even where premium climate knowledge is low and manifestly credible sources of information are not readily available. The implication is that comprehensive response mechanisms are likely to be positively received because the interlinked nature of the chief concerns held across populations is understood. Specifically, climate impact is greater in Trio (9 of 52, versus 8 and 5 for leadership and harmony and sanitation, respectively), equal in San Miguel (2 of 9, alongside wild animals) and second in Indian Creek (6 of 39) alongside electricity, leadership and harmony but behind Sanitation (8) and Flowers Bank (7 of 40 versus transport at 8 of 40).

Theoretically, this offers strong support for my observation of the high discernibility of signs and impact perception in resource-dependent contexts, which accrues substantial experiential knowledge. Although variably credible, it forms a critical knowledge base that can be leveraged and structured by information provision mechanisms through projects and other manifestly credible sources. In other words, not only is the extant literature's (Moser, 2009) concern about climate change communication being uniquely challenging because of distal and imperceptible impacts and low perception of personal risk (Board, Fisher & O'Connor, 1998; McDaniels, 1996) inapplicable in resource-dependent contexts, but the holistic purview of life

and manifest interlinked nature of highly discernible impacts variably override even intractable knowledge gaps and likely precludes the emergence of climate denialism, which is entirely absent from the dataset. This is reinforced by the fact that the pattern of prioritizing CC-Impact is also evident when invoked as a ranked factor across all age and gender cohorts overall. It is also notable that women, who are relatively less knowledgeable about climate change, account for the greater prevalence for climate change as a singularly mentioned angst (five of six) and both young women (50 percent) and older women (33 percent) outstrip their male peers (young men 17 percent and older men zero). However, older men, who account for no prevalence for climate change as a singularly mentioned factor, is the only group for which its resonance is so great that as a ranked factor it outranks all other angsts for the cohort (20 percent). The cohort's distinction is consistent with its climate knowledge advantages, substantially higher awareness of impacts and action, primarily due to being directly involved.

For all other cohorts, climate impact is a first-tier factor: tied first alongside leadership and harmony (23 percent) for young men and tied second for older women (12 percent, behind leadership and harmony at 17 percent) and young women (17 percent, behind sanitation at 23 percent). This suggests both cohorts of men were more impacted by the ranking of factors and the women showed more sturdy perceptions of their angsts. The lower tendency to rank climate impact as a first-tier concern among older women compared to all other cohorts is consistent with their lower climate knowledge, heightened perception of impacts and actions but disproportionately higher levels of fatalism with limited mutability and general externalization of cause beyond the purview of humans, particularly in Flowers Bank. Whereas, the similarity among young men and women is consistent with nearly identical levels of premium climate knowledge among both cohorts (50 percent and 52 percent, respectively). However, the notably

higher prevalence of concern about climate change impact among young men is likely a function of the higher levels of fatalism and externalization of cause to domains outside the purview of humans (nature), notwithstanding their perception of fewer impacts and greater levels of climate action.

However, these gendered observations vary widely across villages as angsts are contextually driven. For instance, sanitation, which ranked first in terms of prevalence singularly and overall for young women, is almost entirely accounted for by young women from Indian Creek at the cohort level (86 percent), while young men from the same locality account for the entirety of their cohort's contribution to the prevalence for leadership and harmony. The high perception of fissures in the communal harmony and leadership structures among young men further clarifies the higher preference for external leadership and lower collective disposition among young men compared to young women. The gendered observations for first-ranked angsts also holds true for the second-ranked angsts for each subset across cohorts. Specifically, road is ranked second for young men, but is entirely accounted for by those in Flowers Bank (three of three) and the second ranked angsts for young women (transport) is also entirely accounted for by those in Flowers Bank. A similar pattern is observed for older folks. For older men, health centre, road and sanitation rank second with prevalence of seven percent each, with all men declaring health centre and sanitation coming from Trio (three of three each) and those declaring roads coming from Trio and Flowers Bank (two-thirds and one-third, respectively). For older women, electricity, the second-ranked angst for women overall, is entirely reflective of the concerns of residents in Indian Creek.

Excerpt 72: Concerns about socio-legal issues/land rights undermines confidence in the collective and traditional order.

Older Men Focus Group – San Miguel, Ya'axché Subset
Interviewer: Apart from climate change, what are the two biggest problems in San Miguel? Respondent 1: Like with the land and like how Christina [arguably the leading Mayan activist for communal land rights], with the land. When it's free, we would like to know about it because the government want the land and then we hear that the land is in the hand[s] of Christina;

and then the people are planting, farming; and when the government gets hold of the land, they will lose. It is good that… if it is your own property then that is not a problem, but if not then it will be hard.
Interviewer: Is it communal land rights in San Miguel or individual? What about in this village is it [that] your land is communal?
Respondent 1: In the Toledo District, yes communal.
Respondent 2: I don't know about them because mines [sic] is private land.
Respondent 3: Well my one [sic] is lease. It is not [my] property yet but since you mention this Christina Coc, she is fighting for communal land. I don't know, but she say[s] it is communal land for the Mayas [that she is] fighting to [sic] the government. It's no agreement to [sic] it yet but I have a lease.
Interviewer: [Do] you prefer private property or communal [rights]?
Respondent 1: Yes.
Respondent 2: Yes, because actually the land will be for you, but it is hard if it is communal.
Respondent 3: Yes
Interviewer: Do you think the land problem is a bigger problem than climate change? And why do you say that?
Respondent 1: Climate because…
Respondent 2: My land because [I] work on the land.
Respondent 3: That's a hard question to answer.

Excerpt 73: Collective order and action are undermined by coordination and communication challenges

Older Women Focus Group - Flowers Bank, CCCCC Subset
Interviewer: What are the two biggest problem or challenges in the village for you? Respondent 2: I would say unity and climate change. Interviewer: Unity and climate change. And which one would be ranked as number 1? Respondent 2: Climate change. Interviewer: Why? Respondent 2: Sometimes [I] go to Belize [City] and [I am] no[t] prepared for the cold and when you get up weather change up [referencing the weather in the mornings]. You never took [sic] your sweater. Interviewer: Yeah. It affects your movement. What are the two biggest affecting the village in your opinion? Respondent 3: I would say cooperation. Well, for me, I have my own transportation. Why I would say cooperation. Today is Sunday, and I have to go to church and I come after when I done church, but if it was another day, I would have been here early. But the days that…see like how only we are here right now, you see. Everybody else could have come out just like we [did] and listen and understand. Interviewer: So, you think cooperation is the bigger problem? Respondent 3: That is what I think Interviewer: Number one for the village. OK. Ms. [name of respondent 6 redacted], [the] two biggest problems for the village? Respondent 6: Biggest problem is participation and communication. Those are the biggest problems.

Conclusion

Consistent with findings in the precceeding chapters, this chapter underscores the high discernibility of climate impacts, sociotropic risk disposition and heightened appreciation of the complexity of unprecedented geologic change in resource-dependent contexts. The heightened appreciation of the multidimensionality of climate impacts, and absence of climate denialism, even amidst substantial knowledge deficiencies, in these environs underlies the import of the sustainable development reading of climate change that underpins this study—specifically, the need to treat mitigation and actions addressing impacts as components of broader adaptive mechanisms necessitated by subsistence and existential imperatives rather than merely geologic change. So, whereas Glantz (1990) contends that mitigation should be foregrounded because it is

more politically expedient for global mitigative action, at the level of the quotidian where an integrative/holistic purview is the dominant, comprehensive adaptation is most urgent and likely most resonant and effective. The study also lays bare the importance of engagement mechanisms in maximizing the efficacy of the comprehensive adaptation response frame.

It clarifies the need for explicit provision of climate change information even in interventions that are manifestly linked to climate change. Specifically, the enactment of a comprehensive response mechanism (e.g. Flowers Bank) that is devoid of accompanying information constrains even an otherwise knowledgeable and directly engaged population from discerning climate action, amidst high perceptibility of impacts. Moreover, while improved subsistence is a motive for climate action, a primarily economistic and subsistence frame is likely to undermine empowerment possibilities associated with even conceptually expansive and transformative endeavours with endogenous origins. The study also highlights the efficacy of targeted interventions that prioritize practical engagement, training and experimentation over sustained periods in domains of common interest. Such interventions, as evidenced in Trio, are likely to accrue indirect population-level knowledge benefits, even among cohorts that are not engaged due to the relevance of actions and the discernibility of responses that comports with impact perception (e.g. older women in Trio).

Notwithstanding the relatively small sample size, the theoretical and practical implications of engagement under both scaled versions of these endogenous interventions are substantial and consistent with observations in the two previous cross-cultural case studies. At one level, they both indicate that the fluidity of the micro-politics of participation and empowerment (where control is reposed, the nature and structure of engagement elements, especially who are engaged and how) more decisively determine the efficacy and empowerment

potential of an intervention than its endogeneity. In the second instance, the study suggests that targeted or sub-maximal level interventions focused on domains of shared import (e.g. agriculture) over sustained periods accrue substantial population benefits that warrant a more textured view of the efficacy of ecological viewpoints on social change that accords heightened import to duration and domain of focus rather than just scope. Theoretically, it also indicates that formal knowledge introduced through practical training and experimentation afforded by external entities does not necessarily undermine or replace traditional knowledge, but rather updates and reformats incapacitated experiential knowledge. Experiential knowledge's critical role as the foundational substance of indigenous knowledge systems and its continued salience for adaptive capacity in mobilized resource-dependent contexts (both Indian Creek and Trio) means integrative knowledge systems that also expands the tapestry of knowledge are of paramount importance for boosting climate knowledge, knowledge operationalization, as well as optimizing agency and action. This is especially important given its compatibility with the traditional order (i.e. the basis of the traditional knowledge systems), which is critical for the maintenance of cohesion in collective contexts where interdependence is high and manifests in primarily shared risk depositions and motives (socio-tropic and biospheric).

Relatedly, the study underscores the limitation of primarily techno-economistic adaptive frameworks and their significantly counterproductive role where holistic worldviews are dominant. It highlights how socio-political (e.g. land rights), cultural, spiritual, environmental, contextual and institutional capacities function as interrelated facets through which climate perceptions and capacities are structured varyingly at population, cohort and individual levels. This suggests that even where a primarily socio-tropic motive underpins perception of risk and motive, other key perceptual frames and capacities (food security, biospheric, religious,

proximity to environmental/physical vulnerabilities e.g. rivers and anti-environmental activities, such as agro-industrial pollution) and the fixity with which they are held can structure perception of impacts, risks and responsiveness to action and messages.

The strong evidence underlying the efficacy of exposure to new formal and informal experimental knowledge systems, new internal institutional mechanisms interfacing with external actors and systems, which correlates with shifting confidence in the traditional order to tackle unprecedented challenges and broader evidence of fissures in the collective order due to the effective advocacy of extra-traditional actors for communal land rights, underscores a need for bridging structures. The study illuminates how bridging structures that enhance rather than usurp traditional authority are likely to buttress internal harmony by empowering the most legitimate and durable institutional mechanism in traditional and indigenous contexts, which is vital for the mobilization of collective agency. The efficacious integrative knowledge process observed in Trio, where new specialist institutional mechanisms (the cocoa farmers group) have been effective, underscores a fundamental way in which bridging structures should function.

Most importantly, contrary to assertions by metropolitan scholars (Hackett, Forde, Gunster, Foxwell-Norton, 2017) that the availability of information is a secondary challenge, this study highlights a need for a wider tapestry of manifestly credible information. It found that amidst absent and weak information mechanisms, there is a uniformly dominant knowledge-seeking disposition spurred by an existential motive that is strongly associated with the high perceptibility of subsistence-level climate change impacts. Additionally, the variability with which even manifestly credible sources are available across populations is consequential—specifically, the form, accessibility, duration, scope and relevance of information provided by news (chiefly radio and television), school and project intervention, which are varyingly

available across and within populations, differentially structures climate knowledge and operationalization. These observations are significant for efforts to mobilize climate agency and enable effective action, as they clarify the socio-cultural and contextually determined nature of project information provision mechanisms and the broader availability of relevant and accessible climate information. The significance of access, form, duration, scope and relevance of even manifestly credible sources, alongside the maximalist knowledge seeking disposition, suggests key factors, long considered individual level barriers to climate action (Lorenzoni et. al., 2007), are more contextual in resource-dependent collective spaces. This highlights a critical locus of action for the effective design and pursuit of adaptation pathways envisioned in these contexts.

Chapter Nine: Conclusion: Raising Public Consciousness and Enabling Action

This comprehensive cross-cultural, multi-country study of climate change perception and response focused on disproportionately vulnerable resource-dependent contexts offers compelling insights for the optimization of climate change communication. Considering the scope of insights generated by this intersectional empirical scrutiny of climate change communications in 17 villages in Belize, Fiji and India, this chapter highlights core commonalities and differences about communicating climate change. The chapter contemplates the significance of these insights in the form of a synthesis of cross-project observations rather than the country cases, which do not tell single stories or offer uniform insights.

Crucially, the chapter articulates critical elements associated with distinct communicative approaches necessary for the pursuit of three climate action pathways that encompass a wide range of futures that can be endogenously envisioned. Consistent with the explicit reparatory political consciousness that underpins this study, I probe the nature of communication required for merely coping with, adapting to and pursuing transformation amidst unprecedented anthropogenic climate change. These three communicative pathways, which are intended as functional corollaries to Pelling's (2011) tripartite adaptation framework, are systematically delineated based on the intersectional case studies. Accordingly, I will articulate the climate action pathways and futures possible under the seven distinct adaptation projects studied based on their conceptualization. Owing to the variable nature of project implementation and engagement across contexts, I will map each of the 17 villages across these climate action pathways with keen attention to the communicative modalities employed. While the project sample is small and only representative of the contexts studied, the high degree of cross-cultural

and cross-national commonalities observed, strongly underscores the transferability of these actionable insights.

Squandering Positive Perception and Ownership

The elicitation and analytical technique employed by this study demarcates fascinating thematic commonalities and distinctions across the case studies. Across all 17 study sites, the climate change interventions achieved near maximal levels of positive perception, with primarily immediate acceptance or positive belief progression. This is consistent with and chiefly attributable to the seven initiatives' consultative design, alongside explicit endogenous generation in Belize. However, the efficacy of endogenous or consultative design is a function of the nature and quality of the manifestly credible and current climate change information environment available in each context, alongside engagement and use patterns. Chiefly, the nature, scope and quality of the information provision mechanisms varyingly afforded by the projects across villages and even cohorts and groups within a given village.

Emblematically, climate knowledge and operationalization are substantially undermined in contexts where endogenously derived (Flowers Bank Village in Belize) or varyingly consultatively formulated interventions (all villages in India and the tripartite Fijian settlement of Seaqaqa) are implemented with a primarily economistic frame and devoid of associative climate change information. So consequential is the implementation of consultative and/or scaled endogenous initiatives without associative climate change information that it can even constrain the perception of climate action where there is population level involvement and substantial levels of self-management. While these interventions boost both coping and adaptive capacity, their manifestly reductive economistic framing is likely to cauterize the transformative potential of even compelling and comprehensively designed responses. This is typified by the inability of

even the self-managed in Flowers Bank, Belize to perceive the climate responsive nature of the CCCCC-led Cohune Palm Nut Project, which uniquely tackles both the root cause of climate change (dependence on fossil fuel) and explores expansive associative livelihood opportunities.

However, as observed on Yaqaga Island in Fiji, even consultatively derived interventions with associative information can cauterize transformation where limited resources compel the pursuit of circumscribed and piecemeal actions that are themselves consultatively derived through progressive prioritization approaches that privilege ranking over voting. While an inclusive engagement mechanism, resource constraints and the pursuit of an isolated action drawn from a set of intersecting first-order challenges truncates people's fundamental needs and can undermine climate change agency, project perception and overall adaptive capacity. It reinforces the need to and efficacy of addressing climate adaptation as a complex challenge rather than a discrete phenomenon. This invariably means establishing partnerships and/or working with communities to articulate how, where and with whom to collaborate to establish linked actions, where resources (project cycle, funding, staffing, among others) preclude comprehensive responses by a singular entity or project.

Conceptually, the diminished outcomes from endogenous and collectively derived climate actions observed suggests the transformative potential of local ownership underscored by critical perspectives on development is subject to the politics of participation and other intervening factors. Thus, in terms of individual or population level enactment of agency, the high positive perception of the primarily economistic communicative frames associated with the interventions studied is indicative of Webster and Engberg-Pederson's (2002, cited in Holland, Brockles and Abugre, 2004) distinction between strategies by the disadvantaged to access resources and those that influence policy design and implementation with redistributive and

equity motives. However, there is also evidence of programmatic foreclosure of the populations' ability to fully grasp and effectively structure the transformations made possible by the intervention because of the absence of information and communication necessary for transforming social structures (Dutta, 2011) across the Indian villages, Seaqaqa in Fiji and Flowers Bank in Belize. So, while the project interventions in these contexts are marked by endogenous origins rather than exogenous pre-determination, they manifest as instrumentalist participation modalities, which Masaki (2004) contends often undermine transformative grassroots impulses. The latter is expounded upon in the sub-section below exploring the adaptive pathways enabled by each project.

Intractable Knowledge Gaps

Profoundly intractable levels of collective knowledge gaps observed across all study sites are illustrative of how the weak information provision mechanisms associated with the projects, particularly those devoid of associated information, substantially undermine the transformative potential of collectively derived and endogenous aspirations. Knowledge gaps range from a low of a fifth in the Fijian dataset, to approximately a third in India and nearly a half in Belize. Similarly, premium climate knowledge that enables people to draw connections between cause and effect, recognize ensuing or potential to enact action, as well as cultivating and mobilizing agency, only exceeds a half in Fiji and is primarily associated with the Gau subset, one of three. These distinctions manifest at cohort levels that demarcate older men as distinctly more knowledgeable across all field contexts and projects. This is chiefly due to the commonality of engagement through the domain of farming, which is customarily a male sphere in these resource dependent contexts where the gendered division of labour is firmly established. However, this knowledge distinction is uniformly observed among older men who are directly engaged. Other

groups of men generally exhibit similar levels of climate knowledge as young men and young women.

However, older women are universally the most knowledge deficient and informationally underserved cohort, except in discrete locations such as Flowers Bank, Trio (Belize) and Malawai and Lamiti Villages (Fiji), where they are directly engaged by the project or engagement has been underway for sustained periods of at least a half-decade (Malawai and Lamiti Villages in Fiji and Trio and Flowers Bank in Belize) in domains of shared interest that accrues population-level interest, experiential and grapevine knowledge transference.

Older Women & Disproportionate Knowledge Deficits

Across the diverse study sites, older women exhibit near uniform knowledge deficit that is reinforced by the distinct way a confluence of their age, gender and the micro-politics of space and participation disproportionately exacerbates their ideational (knowledge and knowledge operationalization) and agency mobilization deficits, which are caused by a weak tapestry of manifestly credible sources of climate change information in resource dependent contexts. Unlike all other cohorts, older women have no organic primary source of manifestly credible climate change information. Young men and women, by virtue of age, benefit from increasing access to basic education and the incorporation of environmental elements into the curricula and universally cite school as an initial, recent and primary manifestly credible source of information.

Similarly, older men tend to cite the project intervention—which they disproportionately benefit from because the domain of engagement is their socio-culturally defined sphere of work—and news, which they consume during leisure time and routinely via radio while working. While news is ostensibly available to all, the Indian case manifestly highlights how socio-

cultural obligations across traditional contexts impose time constraints that limits women's social time such that they have less than men to allot for watching and listening news and attend population-level meetings where projects provide information. Relatedly, population level engagement through village meetings, which are generally aimed at older residents, does not automatically attract or benefit women. Cultural and socio-spatial barriers curtail the extent to which women participate, and even when they attend, they function differentially, which reinforces intractable levels of knowledge gaps and agency among older women.

While the overall knowledge deficit among older women offers very narrow support for the consensus in the extant literature that women often exhibit lower technical knowledge about environmental concerns (11 of 16 studies reviewed by Davidson and Freundenburg (1996)), the consequential factors are more situational (access, engagement and availability) rather than individual, such as a lack of motive or a knowledge seeking disposition as implied by the extant literature. As observed in each case, while these situational factors manifest in knowledge distinctions that support Tichenor, Donohue and Olien's (1970) knowledge gap hypothesis, in terms of information or knowledge advantages rather than socio-economic status, the consonance of the nature and scope of information provision modalities even when manifestly credible substantially delimits even more recent incarnations of this hypothesis (Boykoff, 2011; Yang & Ho, 2017).

Climate Information Deprivation: Availability, Access & Quality

The implication is that contrary to cosmopolitan contentions that the availability of information is not the problem in communicating climate change (Hackett, Forde, Gunster & Foxwell-Norton, 2017) and a degree of information saturation has been reached (Gunster, 2017), the availability and access are foundational climate change informational challenges in all the

resource dependent contexts studied. Across all study sites, access to and availability of a diversified array of manifestly credible climate change acquisition sources correlate with higher climate change agency, knowledge and other critical dimensions for mobilizing knowledge and agency. However, so operative is the informational deficit across all contexts that the grapevine and variably credible experiential knowledge are accorded heightened significance while manifestly credible sources of information are variably available, accessible, and substantial. In all three country-level cases, there is compelling evidence that circumscribed issue-specific information provision, even alongside manifestly credible sources, as well as economistic framing devoid of associative information undermines climate knowledge. Considered alongside evidence of situational barriers reinforced by socio-cultural factors, the operative foundational climate informational and knowledge challenge is simultaneously a question of availability, access and sufficiency. Specifically, the efficacy of climate change information is chiefly subject to its nature (currency, frequency, practicality and scope) and quality (level of accuracy).

Emblematically, the country-level cases highlight the consequential role of the type of manifestly credible source of climate information and their likely impact when deployed independently or collectively. Where climate change interventions offer limited, primarily economistic and issue-specific information or none, news is demarcated as a more substantial source of climate change information for positively structuring climate change dispositions.

Whereas the project intervention presents climate change with issue, context and domain specificity that narrows the scope of knowledge provided such that cause and proximity are faultily hyper-internalized, news coverage of climate change serves a translating function focused on describing a wider range of issues, domains and contexts, which correlates with a lower tendency to internalize cause at the village level. However, targeted interventions that

provide practical engagement, training and experimentation over sustained periods focused on a range of issues such as the Vanuaso Tikina Project in Fiji or primarily in a single domain of shared interest such as the Ya'axché project in Belize, are more effective. Unlike news and projects with information provision mechanisms, school, the only other manifestly credible source of climate information available in the contexts studied, is temporally delimited or time-bound. The temporal foreclosure of access to this expansive and credible source of climate change information precludes updating and at-will consultation that uniquely disadvantages the demographic (youth) most dependent upon it. This accord heightened importance to the nature and quality of climate change information provision mechanisms (formal and informal) provided by projects in resource dependent contexts.

Contradicting Cosmopolitan Consensus:

High Knowledge Seeking Disposition, Dominant Food Security Perceptual Valence, High Discernibility of Complex Signs; Dominant Collective Motive and Risk Disposition

Privileging climate change information provision modalities in project engagements across resource dependent contexts will therefore attenuate the way in which a paucity of current and manifestly credible sources of climate change knowledge acquisition sources constrains climate change agency and knowledge operationalization. This is crucial, given the uniformly maximal climate knowledge seeking disposition observed across these contexts. This compelling knowledge-seeking disposition and curiosity despite informational and broader resource gaps that constrain agency, exists alongside a primarily collective/communal motive and risk disposition to act on climate change. The knowledge and resource gaps also persist amidst the absence of climate denialism, which are conventionally associated.

The commonly dominant socio-tropic motive discerned is contrary to the consensus in risk communication of the primacy of personal threat, including progeny, in motivating behaviour (Maibach, Roser-Renouf & Leiserowitz, 2008). Compellingly, even risk specification functions secondarily and with a degree of collectivity. Risk specification is expressed secondarily in nearly all instances across country cases and generally only after direct probing. In all cases, it is chiefly driven by explicit contextual vulnerabilities, namely proximity to domains of risk such as rivers, coasts and hillsides. These contextual commonalities and uniform sturdiness of a primarily collective or socio-tropic risk disposition is a salient elicitation marker that clarifies points of leverage for optimizing climate change communication as risk disposition is a corollary to motive. Human progeny, which is so widely embedded in the public consciousness as a commonsense motive for climate action, is so marginal in these communal contexts that explicit concern about children was only mentioned four times—twice in Belize across two villages (Flowers Bank and Trio) and once each in Fiji and India. Further, human progeny is accorded equal or lower significance than other minor motives, such as in Belize where human progeny only accounts for two of seven instances in which self/offspring emerged as a primary motive.

The conscious articulation of an operable risk disposition across all contexts amidst knowledge deficiencies suggests risk perception and motive are largely independent of climate knowledge, in accordance with findings by Leiserowitz (2003). However, the maximal knowledge seeking disposition undermines the applicability of Lorenzoni, Nicholson-Cole and Whitmarsh's (2007) assertion of a trifecta of individual level barriers to communicating climate change. Lorenzoni et. al (2007) note a lack of knowledge, lack of desire to find out information and a lack of locally and personally relevant and accessible information are primary barriers to

communicating climate change. Whereas the maximal knowledge-seeking disposition counters the second criterion, the first and third manifest as socio-cultural and contextual determinants rather than individual factors in the contexts studied.

The uniformly positive and dominant knowledge seeking disposition observed across all study sites is a product of the high discernibility of signs and indicators of climate change. Remarkably, while signs and indicators (as well as responses) are highly contextually structured, climate change is chiefly perceived through a food security valence across all contexts. The consistency of the food security perceptual valence with the populations' co-existence with the environment and subsistence on natural resources means an existential motive spurs a search for knowledge. This high perceptibility of climate change signs and indicators even amidst intractable levels of knowledge deficits and fissures in the climate information provision mechanisms available on the margins confounds the widely held contention in the extant literature that the communicability of climate change is uniquely challenging because of limited perceptibility, including "invisibility of causes, distant impacts and a lack of immediacy and direct experience of impacts" (Moser, 2010).

Similarly, the co-existence of multiple discernible local manifestations of climate impacts, including health, that are readily associated with climate change and variability by populations with knowledge deficits counters the claim that complexity and multidimensionality undermines the communicability of climate messages (Nisbet, 2009, Moser, 2010). Rather, across all contexts, the discernibility of complex impacts at a subsistence level structures opinion intensity so decisively that amidst resource gaps, there is no discernible element of climate denialism, and it is compelling socio-culturally changes that manifests in uniform attrition in confidence that the collective and traditional order has the capacity to tackle climate change.

Theoretically, this means complexity and profound discernible impacts rather than accurate knowledge of causes of climate change are the most powerful predictors of intention to take voluntary actions in low capacity resource dependent contexts. As observed in discrete chapters, but applicable across all cases, this is in accordance with Leiserowitz (2003), who found no noteworthy link between accurate knowledge of climate change cause and solutions, nor reported or intended actions.

While most pronounced in the comprehensive ecosystems-based adaptation project underway on Gau Island in Fiji, this study also suggests the consonance of proximal perceptibility transcends temporal and spatial considerations. Even in contexts of high knowledge, proximal climate actions that are routine, domestic and income generating, are recognized as ongoing but are not identified as climate change actions. Similarly, distal and specialist actions, such as the re-emergence of bird species and use of submerged fish aggregation devices, are not recognized. This confounds the widely accepted notion that proximal limitations on climate perception, action, agency and knowledge are singularly associated with temporally and spatially distal concerns, such as multi-generational projection of impacts and geographical distance from endangered islands and/or species such as polar bears (Lorenzoni & Pidgeon, 2006; Moser, 2010; O'Neil & Hulme, 2009; Spence & Pidgeon, 2010; Weber, 2006).

Conversely, it also undermines the view that spatial proximity automatically accords higher levels of climate awareness and knowledge (Galloway, 2010). The socio-cultural elicitation and clarification of the nature of the proximity thesis is consistent with shifts in the consensus around the proximity thesis associated generated from discrete experimental observations. These experimental studies include Herring et al.'s (2016) study of data

visualization of climate science that indicates greater salience of temporal rather than spatial proximity.

While the core commonalities across projects reviewed thus far comports with my expectations as a climate change communication strategist who has direct experience working across and lived connections with resource dependent contexts, there are also several significant unanticipated and primarily common findings of theoretical and practical import.

Knowledge Systems

No Antipathy to Formal Knowledge

Chiefly, there is no discernible antipathy to reformatting and/or updating traditional knowledge. Across all contexts studied, formal and scientific knowledge is highly sought, as evidenced by the maximalist knowledge seeking disposition. The introduction of formal and scientific knowledge is highly valued and socially determinative where introduced. Specifically, it generates shifts in confidence away from the traditional and internal institutions for leadership on climate change towards discrete groups with scientific and formal knowledge advantages. Internally, these include young people who benefit from climate knowledge introduced in the education system and older men, primarily those directly engaged individually or through membership in specialist activity groups. This commonality is theoretically significant as it challenges the widely accepted view that "book knowledge and schooling undermine[s] the appreciation of practical indigenous knowledge" (Korma, 1995, cited in Kohler-Rollefson, 1996, p. 11). Rather than a lack of appreciation of practical indigenous knowledge, the universal cross-context value and determinative infusion of formal knowledge discerned is indicative of the knowledge systems emergent and integrative nature. As observed in all village clusters where new formal and informal experimental knowledge systems (such as climate smart techniques and

crop diversification) are introduced (four of seven - Gau Island subset in Fiji, both village subsets in India and Ya'axché subset in Belize), adaptive capacity and local confidence is improved. In fact, where formal experimental knowledge systems are infused with associated and ongoing information (Belize and Fiji), climate knowledge is enhanced, as well as its operationalization across critical dimensions relevant for enabling action.

Scope and Impact of Traditional Knowledge's Incapacitations

The lack of antipathy to formal knowledge and its positive structuring effect underscores the continued relevance of experimentation to reformat, improve and accord relevance to traditional knowledge, which is being incapacitated by unprecedented geologic change. This finding is consistent with Showers's (1996) contention that there is limited utility in separating conceptions of indigenous knowledge and scientific knowledge for environmental researchers, particularly those committed to using ethnoscientific techniques to improve the design and communication of interventions to address unprecedented geologic change. Moreover, the finding underscores the conscious paradigmatic decision to eschew essentialism in the pursuit of this study using a culture-centric participatory purview. The identification of astounding incapacitations of traditional knowledge systems is a direct outcome of this conscious decision. This is typified by substantial concerns across all cases and acute subsistence precarity in the Indian context about the failure of agricultural techniques and practices that have been cultivated and effectively deployed for centuries. These vast incapacitations are indicative of climate risks exceeding socially acceptable levels of risk that Adger et al.'s (2009) contents can spur changes in attitudes towards climate policy and action.

While incapacitations were anticipated, the extent and threat it poses to the social order are novel empirical observations. Of principal consequence is the universally heightened attrition

of confidence in internal capacity, including traditional structures, in small, interdependent contexts, where motive and risk disposition are primarily communal. This is consequential both for social cohesion and the efficacy of climate response mechanisms on two critical levels. First, response mechanisms will be profoundly challenged by fissures in the social order that fragments leadership confidence across groups and cohorts with sub-maximal legitimacy. Secondly, the attenuation of collectivity will erode the dominant multi-level collective motive that also accurately structures a primarily shared risk disposition amidst palpable climate knowledge deficits and a weak climate information environment.

Relatedly, the study suggests unprecedented and sustained impacts of climate change so destabilize confidence in internal capacity that it limits the use of established and promising practices. Specifically, the Indian case indicates how the seven Adivasi hamlets, which have a history of managing droughts and other discrete environmental crises for the enactment of religious festivals or pandugas and practices such as Vittanalapanduga (seed festival), lack the motive to leverage such capacity to meet routine subsistence needs. This is highly significant, given the direct relationship between agronomic activities and pandugas. The potential utility and consonance of the agricultural, horticultural and forest produce cycle with festivals (see Appendix N.1 to N.5) supports Titilola's (1994) contention that sustainability is best achieved by according the socio-cultural equal, if not greater, importance to physical and biological constraints to boost engagement in holistic knowledge and experiential contexts (Duhaylungsod, 1994; Reichel, 1994). However, this tradition functions in conflicting ways that warrants management. Specifically, it simultaneously drives conspicuous consumption alongside critical production, which demarcates the socio-cultural as both a limiting factor and enabler for mobilizing climate agency and boosting adaptive capacity. Nonetheless, the indication of climate

change's incapacitation of traditional knowledge systems, both in terms of its utility and confidence in its potential, also highlights that the limited mobilization of the socio-cultural functions at multiple levels.

Bridging Structures and Approaches

However, findings from both Fiji and Belize strongly suggest bridging approaches and structures, respectively, can be effectively deployed to allow the mobilization and reformatting of traditional knowledge to address climate impacts and allay attrition in confidence in internal capacity. In both cases, positive perception of the main project agent's expertise, belongingness and the consonance of the proposed activities with the worldviews and experiences in the resource dependent contexts enhanced the implementation of local actions without undermining the most enduring and legitimate authority structures. While this conforms with broad consensus in the extant literature about the importance of effective selection of messengers and champions (Moser, 2010; Agyeman et al, 2007) for successful communication, the decisive factors are the level and nature of their involvement. Specifically, technical involvement and leadership, as well as latitude to privilege activities and provide information in accordance with local customs and systems. Representatively, all research sites, except Flowers Bank in Belize and the Seaqaqa settlement in Fiji, had a main agent (Yaqaga and Gau Islands (two of three in Fiji) or both agent and entity led by and exclusively focused on supporting the cultural group sampled (Ya'axché subset in Belize (one of two), and both subsets in India).

However, the consonance of the interventions with traditional systems and approaches and the provision of efficacy building information is greatest and most decisive where the connected group (Ya'axché Conservation Trust) or individual (marine scientist and ecosystems scholar Dr. Veitayaki for Gau Island) has explicit technical capacity and primary leadership for

crafting the infusion of relevant formal knowledge and activities. Whereas this functions at a population-level approach through Dr. Veitayaki's guidance of the conceptualization and implementation of the initiative on Gau Island, it is most prescient through targeted and sustained engagement of individuals and via new specialist, institutional mechanisms initiated by self-motivated actors in the Ya'axché supported intervention. Instructively, both of these highly experiencial intiatives provided efficacy building information on a primarily 'need-to-know basis,' which suggests climate action is likely more effective when enacted in relevant and practical frames rather than being in inaccessible and technical(western) conservation language.

While cultural sensitivity is an operable factor in the concerted deployment and efficacy of both initiatives, trust in the body politic's processing capacity may also be a factor. Across all country cases where supporting groups and individuals are culturally connected with the intervention site, people distinguished by their relative educational and cultural capital staff them. However, this has manifested in articulations about the cognitive limits of the uneducated to the researcher. This was palpable in India, where cultural and ethnic connection, significant technical capacity and primary leadership manifest in circumscribed issue-specific responses, as well as economistic and subsistence response frames.

Socio-Cultural Determinants: Complexity and Limits of Religious (and Nature) Frames

Cognizance of the import of cultural sensitivity, alongside the socio-cultural elicitation of specific culturally bounded climate change dispositions and leverage points for boosting agency, points to socio-cultural enablers and limits to the communicability of climate change. While the researcher anticipated the import of the socio-cultural and conceptualized this project as a response to the overdetermined techno-scientific and primarily cosmopolitan reading of the field, its profound, primary and differential manifestation, even within age and gender cohorts,

specialist and belief groups, is especially striking. The multiperspectival views and varying amenability to adjustment with the provision of knowledge, associated with religion and nature are particularly indicative. Both factors structure worldviews such that they explicitly limit agency in the form of expressed fatalism, varyingly shapes motive and foreclose understanding of cause. For instance, religious fatalism, which features manifestly in all contexts except the Indian villages and functions with greater fixity than nature-oriented fatalism, structures differing levels of limits and opportunities for knowledge improvement and agency mobilization. This means leveraging religious and nature frames is not a singular mission.

Emblematically, on both Gau Island, Fiji and Flower's Bank Village, Belize, focus group participants within the same age and gender cohorts and membership in similar faith traditions demonstrate frontally proffer differing religious stance on climate action. In both contexts, stewardship perspectives that privilege the scriptural ethic of care offer sub-maximal but significant openness to action and the utility of efficacy building resources, including knowledge. Conversely, more rigid and doctrinaire religious perspectives that privilege end-times readings foreclose belief in the efficacy of likely and ongoing action but does not necessarily preclude engagement as observed in Malawai, Gau Island, Fiji where communal obligation is cited as a mitigating factor. Thus, it is more accurate to speak of highly operative and multifunctional socio-cultural (religious in this instance) limits and enablers of climate adaptation rather than limits per se, as Adager et al. (2009) and to a lesser extent Pelling (2011), do in their interrogation of the notion of adaptation that shifts from a purely techno-scientific reading towards the social, cultural and political.

Adaptation Pathways and Communicative Requirements

Paradigmatic Distinctions and Planning vs Action

So, consistent with the critical reading of adaptation outlined in the theoretical chapter, this study shows that the nature of adaptation is too germane to the quality of human development outcomes and cultural survival to be approached as a narrow "defensive task – protecting core assets or functions from the risks of climate change" (Pelling, 2011, p. 3). While the resource dependent communities studied have lived with environmental change for centuries, the heightened and differential levels at which contemporary geologic change incapacitates traditional knowledge systems and elements of their vital collective social and cultural order means the efficacy and sufficiency of adaptation responses to intensified and permanent climate change will enable various outcomes and differentiating fortunes that are structured by contextual vulnerabilities, scope and capacity to act. The variable efficacy, systemic impact and differing paradigmatic frameworks governing the seven distinct climate adaptation interventions studied, even among villages exposed to the same intervention, underscores this observation. This finding is consonant with Pelling's (2011) contention that adaptation is dynamic and is best understood and pursued "as a process rather than a status" (p. 14). The optimal goal or outcome of this dynamic process (transformation) is realized where social reforms and transformations with reparatory and holistic efficacy building goals are pursued socio-culturally, environmentally and politically. Thus, this study's finding that primarily circumscribed, issue-specific, economistic and information deficient adaptation mechanisms are ineffective, strongly supports Pelling's (2011) hypothesis that adaptation actions can be limiting. Specifically, adaptation actions without an ethico-political consciousness, lacking comprehensive multi-scaled response frameworks, resources and nuanced wide-ranging engagement mechanisms are least likely to

result in robust coping capacity, enable transition and foster transformational change. At best, such marginal adaptive responses enable communities to cope or achieve a degree of resilience.

The empirical evidence is highly consistent with Pelling's theory of adaptive pathways or options. As outlined in the theoretical chapter, Pelling's (2011) progressive tripartite framework for assessing and pursuing adaptation across multiple levels, ranges from resilience (stability), transition (incremental social change and the exercising of existing rights), to transformation (new rights claim and changes in political regimes). Table 57 highlights both the intents and outcomes of the interventions studied across the tripartite adaptation pathways. The table shows the seven projects based on their conceptual frames and programmatic formulation and more granularly, the 17 villages based on the implementation and outcomes, against the three adaptive pathways/possibilities. To account for distinctions in levels of enablement across pathways conceptually and practically, Pelling's frame has been segmented into three levels indicative of the sturdiness or levels of enablement (low - level one, moderate - level two and advanced - level three).

Table 57: Adaptation Pathways and Levels of Enablement Conceived and Realized

Adaptation Pathways		**Coping/Resilience**			**Transition**			**Transformation**		
Level of Enablement		**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Project Conceptualization		EU-GCCA	C-CAP			VTI Ya'axche Project	Cohune Palm Nut Project	PRAGATI-CARE-STEP	Forest Forever! Forests Ecosystem	
Project Implementation & Outcome Across Villages	EU-GCCA	Seaqaqa Settlements								
	C-CAP		Yaqaqa Island							
	VTI					Malawai Village Lamiti Village				
	PRAGATI-CARE-STEP	Agraharam Sunaladana	Itikalakota Palem							
	Forest Forever! Forests Ecosystem	Munagalapudi Pulusumamidi Nallikota								
	Ya'axche Project	San Miguel Indian Creek	Trio							
	Cohune Palm Nut Project	Flowers Bank								

Conceptually, the projects associated with the study sites are robust. Five of the seven interventions are sufficiently crafted to enable at least moderate levels of transition. Specifically, both VTI (Gau Island) and Ya'axché (Belize) can theoretically enable moderate transition (level two). This assessment is premised on both project's comprehensive and explicit focus on climate change, employment of practical and self-enhancing information provision mechanisms, including demonstrative techniques, in accordance with heightened sensitivity to socio-cultural dispositions and authority structures. However, both have been conceived with clear limits to resources, primarily monetary and technical, which are critical for realizing advanced levels of transition. While both initiatives have an ethico-political consciousness that primes them towards the differentiated and disproportionate impacts of climate change, they neither privilege nor articulate rights claim in accordance with the explicit reparatory consciousness and reforms necessary for transformation.

On the other hand, the Cohune Palm Nut Project (Belize) is conceived relatively more expansively. The Cohune Palm Nut Project privileges sourcing heightened financing in a tangible and sustainable manner to tackle both the root cause (fossil fuel consumption) and likely solution to the issue of climate change (renewable energy), alongside sustainable income generating activities. However, it conceives these reforms and transitional livelihood mechanisms within existing state and regional policy terms. So, while it enables advanced transition (level three) conceptually, it falls short of transformation, given its direct conformance with an unreformed and dominant logic that precludes a reparatory consciousness and critical distribution of benefits.

Conversely, both Indian projects are conceptually disposed towards enabling transformations because of their frontal and primary emphasis on a transformative, rights-based

approach towards livelihoods with varying but substantial environmental and agro-forestry focus. Sub-maximal emphasis and distinctions in the degree of explicit focus on climate change and the environment, as well as the range of intended responses, however, accounts for the distinction in the level of transformation possible across initiatives (PRAGATI-CARE-STEP and Forest Forever! Forests Ecosystems, levels one and two, respective). Laya's Forestry initiative, for instance, explicitly tackles the energy factor (both a cause and solution to climate change) at the individual level (rather than systemic), which is absent from PRAGATI's.

The two remaining initiatives, the EU-GCCA Project and C-CAP, which were implemented in Fiji, offer the most limited or circumscribed pathways: coping levels one and two, respectively. Both aim to address narrowly defined challenges in accordance with critical and externally pre-defined resource limitations (primarily monetary), which are elemental for the realization of all adaptive plans. The EU-GCCA project tackles a discrete challenge (water scarcity) through the provision of temporary resilience building actions (centralized tanks and connecting infrastructure to moderately improved natural catchments), whereas, the C-CAP initiative prioritized one aspect (providing an evacuation centre) of an expansive issue of adaptive import (disaster risk reduction) with clearly articulated possibilities and tangential benefits. The marginal possibilities afforded by the only two donor-funded or explicitly macro-development approaches to climate change adaptation is consistent with established concerns within critical perspectives on development about the limits of external funding agendas and circumscribed piecemeal approaches that privileges the documentation of efficacious implementation of narrowly defined and marginally funded projects.

Mapping the projects onto Pelling's tripartite framework also affords the delineation of specific communicative and broader engagement strategies, tactics, techniques and the socio-

political disposition associated with the pursuit of each pathway within the adaptation framework. Three categories of adaptation variables (communicative, engagement and socio-political) across projects have been distilled based on the implementation of the projects. The communicative elements, engagement modalities and socio-political elements at the core of the enacted initiatives underpins the positioning of the villages at differentiated levels within each pathway in the lower section of Table 57.

Distilling and Distinguishing Efficacious Communicative and Engagement Variables

In line with Dutta's (2011) expansive view of communicative acts, distilling these three elements, primarily the first two given the absence of the latter from all but two initiatives, is germane for identifying how and with what efficacy communicative processes manifests during implementation. The communicative elements constitute a critical contribution, because though conceptually and technically consistent with the ethico-political consciousness necessitated by this critical research endeavour, Pelling's rare socio-culturally attentive framework lacks the necessary and corollary communicative guidance for enactment. Further, much of what underpins collective understanding of how to communicate climate change is stock knowledge drawn from communicative approaches to disparate issues across time and contexts (Moser, 2010; Corner, Markowitz & Pidgeon, 2014). Thus, Table 58 highlights distinguishing communicative elements associated with the varyingly promising projects that directly informs the action gap noted by Foxwell-Norton & Lester (2017) and illustrated by distinctions in the pathways conceptually offered by projects and how they materialize (see Table 57 above).

Table 58: Adaptation Variables and Elements Across Projects

Projects	Adaptation Variables		
	Communicative Elements	**Engagement Modality**	**Socio-Political Elements**
EU-GCCA	- Subsistence frame - Limited and issue-specific (irrigation)	- Time-bound - Issue-specific (water scarcity) - Population-wide - Direct engagement of older men	- None
C-CAP	- Limited and issue-specific (DRR)	- Time-bound - Multiperspectival but circumscribed implementation - Population-wide - No cohort specificity - Employs traditional structures	- None
VTI	- Comprehensive and multi-dimentional - Provision of information on a need-to-know basis - Demonstrative	- Sustained over a decade - Multi-sectoral and integrative - Population-wide - Youth involvement but no decision-making influence - Individual and collective engagement of older men - Collective engagement of older women - Practical opportunities & training - Employs local frameworks and traditional structures (fully)	- Engagement with local government within existing structures
PRAGATI-CARE-STEP	- Limited, contingent and issue-specific (on-going events e.g. weather), but primarily devoid of supporting information - Subsistence frame	- Population-wide (variable) - Collective engagement with women but with disparate and limited focus - Implicit incorporation of climate change - Variably engage women and youth. - Varyingly offers practical training on a selective basis - Domain specific (farming and agro-forestry)	- Rights-based perspective - Engagement with government at federal, state & sub-state levels and use of the legislative systems to seek restitution and reform
Forest Forever! Forests Ecosystem	- Subsistence frame - Limited and devoid of supporting information (except for variable selective individuals)	- Population-wide (variable) - Explicit incorporation of climate change - Variably engaged women and youth engagement - Focused engagement on ad hoc basis - Domain specific (farming and agro-forestry)	- Rights-based perspective - Engagement with government at federal, state & sub-state levels and use of the legislative systems to seek restitution and reform
Ya'axché Project	- Provision of information on a need-to-know basis - Demonstrative - Targeted and expansive but domain, activity and experience centred	- Targeted - Variable Cohorts (Chiefly older men) - Domain specific (farming and agro-forestry) - Practical opportunities & training, including selective international exchange - Employs local frameworks and traditional structures (fully)	- Engagement with national government within existing structures
Cohune Palm Nut Project	- Economistic-frame - No associative climate change information	- Sustained for more than five years (ongoing) - Population-wide (primarily female management) - Employs local structures (instrumental)	- Tackles root cause (fossil fuel consumption) in accordance with declared state and regional policy

While none of the projects manifest at the village level more promisingly than conceptualized, the majority (four of seven) manifested profoundly worse. Whereas all the Fijian projects manifested along the same pathways as conceptualized, all others resulted in weak or moderate levels of enablement for coping. In other words, the projects with the greatest promise manifests in the most limited fashion. Both Belizean projects (Ya'axché's and The Cohune Palm Nut Project) conceptually offer moderate and advance transition, respectively, but materializes as weak coping mechanisms at the village level, except for Ya'axché's efforts in Trio (moderate). The Indian projects, which are conceptually most promising, materializes with the greatest attrition. Laya's Forest Forever! Forest Ecosystem Project, which is conceptually most promising (moderate transformation) manifests as a weak coping mechanism. Similarly, PRAGATI-CARE-STEP, which conceptually enables (weak transformation), manifests as a mere coping mechanism in all four villages—half weak and half moderate.

While resources, primarily monetary and technical and adaptive starting-points are critical factors in the variation in project conceptualization and materialization across villages, the variables distilled in Table 58 are highly consequential given substantial variations in manifestation of projects—specifically, distinctions in implementation outcomes within the same village cluster (PRAGATI) and across similarly resourced projects operating in contexts with identical adaptive capacities (both Indian projects). This is typified by PRAGATI outperforming Laya's relatively more promising intents. Similarly, both promising Belizean projects are marginally realized with distinctions within the Ya'axché subset (Trio village) that render the intervention relatively more effective as a coping mechanism than the conceptually more expansive and better funded Cohune Palm Nut Project.

The consistency with which the three Fijian projects materialize relative to their conceptualization reinforces the primacy of the communicative and engagement modalities for realizing variously envisioned adaptation pathways with differential levels of enablement. All three projects vary in scope, nature, cultural attentiveness and duration. These engagement frames have corollary and associative communitive elements that materialize in differing levels of ideational enablement, which is necessary for mobilization of knowledge and agency. Specifically, VTI, the most promising Fijian initiative conceptually and programmatically (overall), features comprehensive multi-sectoral and integrative, population-wide and cohort specific engagements, including youth and women, over a sustained period approximating a decade. It also deploys practical opportunities and training and functions in full accordance with local frameworks and traditional structures. These expansive engagement modalities are supported by corresponding communicative actions, which are framed in comprehensive and multi-dimensional formats, chiefly demonstrative and primarily provided on a need-to-know-basis. On the other hand, the EU-GCCA and CCAP Project, which conceptually and programmatically offers weak and moderate coping, respectively, are limited in scope, (issue-specific and circumscribed, respectively), levels of engagement and use of traditional structures and frameworks (C-CAP only). Whereas C-CAP only employs rudimentary population-wide engagement, the EU-GCCA initiative's marginally more expansive approach only adds a single cohort specific element: older men due to their culturally defined belongingness to the domain of action (farming and irrigation).

All other projects manifested in weak coping, except PRAGATI-CARE-STEP's actions in Itikalikota and Palem (India) and Ya'axché's actions in Trio (Belize). The distinctions in the nature and scope of engagement, and their associated communicative elements, accounts for the

outlying villages. The engagement modalities and communicative elements deployed by the projects in the three outlying villages compares more favourably with the expansive elements observed within VTI. Similarly, the other eight villages, where the respective projects enable weak coping, features elements more comparable with the limited elements deployed in Seaqaqa.

The consequential correlations between the nature and scope of engagement modalities and corollary associative communicative elements illuminates several critical pointers about how to attenuate the profound gap in understanding of how to raise public consciousnesses and mobilize publics to act on climate change (Foxwell-Norton & Lester, 2017). Specifically, limited, issue-specific and economistic frames are ineffective, particularly where associated information is marginal or absent. Conversely, the most effective communicative and general engagement modalities include sustained multi-year, comprehensive and multi-dimensional information provision in a demonstrative fashion, and on a need-to-know-basis. The expansive communicative and engagement frame also includes efficacy building mechanisms, such as training, specific guidance towards and access to alternatives including new crop varieties, maximal incorporation of local frameworks and traditional structures, as well as broad, cross population engagement. The three outlying villages identified reinforce this finding and indicate the determinative role of the nature, form and quality of communicative and engagement elements. Both Itikalakota and Palem, where PRAGATI-CARE-STEP is differentially enacted, benefitted from cross-cohort engagement, including limited and highly selective efficacy building mechanisms. These potentially enabling elements are absent in other villages engaged by PRAGATI and correlates with distinctions in knowledge levels and mobilization. While they enable moderate coping in both villages rather than the weak form discerned in the remainder of the entire Indian sub-set, these critical communicative elements were sub-maximal and

infrequent, namely the engagement of women and youth, rate and scope of training provided and the absence of focused engagement. These contexts have also been exposed to a reactionary rather than programmatic form of information provision on a need-to-know basis, which demarcates limits to the efficacy of the information provision mechanism induced by contingent deployment.

The period of engagement is also a decisive factor, where the expansive frame is deployed with sub-maximal population reach and scope. This is typified by Trio, the third outlying village noted, where engagement is targeted and enacted with domain specificity. However, as previously observed, the comprehensive, sustained and direct engagement of a self-motivated sub-set of the population, including a specialist group, within a domain of shared interest (farming in Trio) accrued population-wide knowledge advantages that distinguishes the village in terms of climate knowledge, even among the single most inform deprived demographic (older women) in the study. The maximal incorporation of local frameworks and traditional structures in the most enabling intervention (VTI) and this cultural disposition's presence in half of the villages that enables moderate coping, also magnifies the import of trust and the socio-cultural as crucial contextual communicative factors for optimizing the communicability of climate change. It poignantly highlights the centrality of communication for the perpetuation of knowledge and a need to accord greater attentiveness to traditional communicative frameworks and systems. Greater attentiveness to traditional frameworks/worldviews and communicative systems which function multifactorially (e.g. religion, holistic purviews, nature, group membership and status) is paramount as they generally contrast with exogenous communicative and belief systems (Mundy & Compton, 1993).

What's Next?

While the illuminations offered by this study are significant, optimal consciousness raising and mobilization of action amidst unpresented climate change necessitates scrutiny of some critical aspects uncovered but insufficiently probed by this study. Chiefly, greater scrutiny of the significance of group membership, including but not limited to standard macro-sociological segmentations, in climate knowledge formation and improvement given its salience and positive distinctions, particularly in Trio and Flower's Bank, Belize. Relatedly, there is great need to clarify mechanisms for leveraging cohort-specific engagement across age and genders, while managing the multi-factorial and individually differentiated manner in which socio-cultural limits and blockages (namely religion and nature) to climate messaging and actions materialize. Crucially, concerted critical attention should be accorded to augmenting fissures in the availability, relevance and accessibility of manifestly credible communicative mechanisms, particularly for underserved cohorts, such as older women and disadvantaged groups such as youth whose natural source is distal (school). Critical attention should also be accorded to identifying and clarifying potential sources of manifestly credible information that can constitute a socio-culturally suitable source for older women, which is the only demographic without an organic or sociocultural primed form. Evidence of a dominant socio-tropic risk disposition and the marginal cognizance of human progeny as a motive for action, even where risk specification is observed, also strongly suggests a need to probe the efficacy and resonance of widespreadprogeny frames in climate change campaigning and policy pronouncements

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Appendix A: Official Codebook

Code Group	Total Codes	Discrete Codes	Definition of Codes
Project Framework: *Theoretical or programmatic approach used by the project.*	1	Framework	Descriptions of the project by project proponents/leaders and project documents that are illustrative or indicative of the intervention's approach, techniques used, guiding principles/steps, and the nature of how projected outcomes (goals and objectives) will come about in the intervention area.
Climate Knowledge Acquisition: *When and where interviewees learnt about climate change.*	11	Before project	Awareness of climate change acquired before the project intervention associated with a respondent's village.
		Catholic Church	Awareness specifically attributed to the institution. Exclude general references to the bible.
		Extreme Event	Awareness attributed to a specific or series of specified natural disasters.
		Friends/Peers/Relatives	Awareness specifically attributed to local interpersonal networks. Include observations attributed to others but are unlinked to personal observations. Exclude personal observations.
		Holy Book	Awareness attributed to a specified religious text.
		News	Awareness attributed to mainstream or official sources of information across media platforms: TV, Radio, Print, or online platforms associated with accredited or acknowledged news sources.
		Never Heard of Climate Change	Never Heard of Climate Change. Exclude failure to recall initial source of climate knowledge acquisition.
		Observation	Awareness attributed to personal observation. Include linked personal and collective observations; Exclude: Unlinked recitation of observations made by others.
		Project Intervention	Awareness attributed to the implementation of the project associated with the village.
		School	Awareness attributed to lessons at school; exclude references to non-pedagogical exposure at school e.g. peers, observations unrelated to lessons during lessons.
		Village Meeting	Awareness attributed to discussions during village meeting. Exclude: Gossip, interpersonal exchange on the sidelines of village meetings, second hand accounts of village meetings.
Climate Risk: *Perception of vulnerability and relative vulnerability in relation to self, community and livelihoods.*	9	Children-2	Mention of anyone under 18 as most, distinctly or disproportionately affected by climate change and/or manifestly linked impacts (experienced and/or anticipated).
		Coastal Dwellers - Self	Persons who live near rivers, streams or coasts who specify themselves as being most, distinctly or disproportionately affected by climate change and/or manifestly linked impacts (experienced and/or anticipated). Do not include collective references to coastal dwellers and their vulnerability.
		Coastal/Riverside Dwellers	Collective references to people who live near rivers, streams or coasts as being most, distinctly or disproportionately affected by climate change and/or manifestly linked impacts (experienced and/or anticipated). Include references to specific individuals and/or families if made by a respondent who does not live near rivers, streams or coasts.
		Elderly	Reference to the elderly as being most, distinctly or disproportionately at risk to climate change and/or manifestly linked impacts (experienced and/or

			anticipated). Include elderly who self identifies and specify their age as consequential.
		Equal Risk	References to undifferentiated risks to climate change and/or manifestly linked impacts in the village. Include statements indicating "sameness" and "similarity."
		Farmer - 2	Collective references to farmers as being most, distinctly or disproportionately at risk to climate change and/or manifestly linked impacts. Include farmers who self identifies to illustrate, and those who self identifies but make inclusive (non-personal) explanatory statements. Include references to specific farmers made by non-farmers.
		Hillside Dwellers	Collective references to people living on hillsides (Hillside Dwellers) as being most, distinctly or disproportionately at risk to climate change and/or manifestly linked impacts. Include hillside dwellers who self identifies to illustrate, and those who self identify but make inclusive (non-personal) explanatory statements. Include references to specific hillside dwellers made by non-hillside dwellers.
		Me	Those who self-identify as being most, distinctly or disproportionately at risk for personal reasons (health, poverty) or any shared status, activity, role or attribute, except age.
		Women - 2	Collective references to women as being most, distinctly or disproportionately at risk to climate change and/or manifestly linked impacts. Include women who self identifies to illustrate, and those who self identify but make inclusive (non-personal) explanatory statements.
Personal Inclusion/Influence: *The project's level of inclusion per interviewee's perception and experience of engagement with project leadership, key functionaries, as well as views on how well the project reflects community priorities.*	5	Mixed - 2	Interviewee's perception of their engagement with project leadership, key functionaries, as well as, views on how the project reflects community priorities includes both positive and negative expressions with cons/pros ratios not exceeding 3:1 in either direction. Exclude ambivalence and non-committal responses.
		Negative - 2	Explicitly negative perception of their engagement with project leadership, key functionaries, as well as, views on how the project reflects community priorities. Do not include itemization of pros and cons unless disproportionate (3:1 and above for cons). Exclude expressions juxtaposing pros and cons, and ambivalence.
		Neutral - 2	Interviewee is ambivalent about their engagement with project leadership, key functionaries, as well as, views on how the project reflects community priorities but offers non-committal responses. Exclude presentation of pros and cons.
		Positive - 2	Explicitly positive perception of their engagement with project leadership, key functionaries, as well as, views on how the project reflects community priorities. Include itemization of pros and cons above 3:1 for pros.
		Youth Consultation	Statements by youth about how they are incorporated in or excluded from village level climate change planning, activities and discussions.
Belief Progression: *How long it took interviewees to accept/repose confidence in the project intervention.*	2	Immediate	Confidence reposed in project intervention and intervention agents upon initiation/introduction.
		Progressive	Confidence reposed in project intervention and intervention agents significantly after implementation.

Project Activities: *Activities the project implemented in the study site.*	1	Project Activities	Activities the project implemented in the study site. Coded to identify which has resonance with the study population. Applicable to project documents only.
Gender	2	Female	Each respondent in a focus group labelled FG YW or FG OW, and individual interviewees labelled with village name and gender e.g. "Rokosalase woman."
		Male	Each respondent in a focus group labelled FG YM or FG OM, and individual interviewees labelled with village name and gender e.g. "Navai male."
Schooling: *Interviewee's level of education.*	4	None	None
		Post-Secondary	Post-Secondary
		Primary	Primary
		Secondary	Secondary
Knowledge: *Statements linking climate change cause and effect; indicators and practices*	5	A Posteriori	Statements accurately linking climate change cause and effect; indicators and practices that is based on what they observe and reflection; Exclude attribution of responsibility.
		Experiential	Statements accurately linking climate change cause and effect; indicators and practices that is based on what they experience; Exclude attribution of responsibility.
		Falsehood	Statements linking climate change cause and effect; indicators and practices with unrelated phenomena e.g. earthquake, expressions nominally accepted as myths, exclude misunderstanding or knowledge gaps.
		Knowledge Gap	Statements incorrectly linking climate change cause and effect; indicators and practices irrespective of the basis (observation, experience, regurgitation).
		Regurgitation	Repetition of statements or facts introduced by the project without reflection, and/or failure to explain why associations are drawn/suggested. Include non-committal/absence of conviction. Exclude incorrect justifications.
Cause and Proximity: *Interviewees' proximal perception of climate change and it's degree of connection to them (cause/attribution of responsibility).*	6	God/Religion	Statements suggesting climate change is divine order. Exclude references to divine beings and scriptural pronouncements on mutability.
		Humans	Statements suggesting climate change is caused by humans.
		International	Statements suggesting climate change is caused by action(s) in a foreign country.
		Local	Statements suggesting climate change is caused by action(s) in local vicinity (village, district, town, city, state.
		National	Statements suggesting climate change is caused by action(s) in home country
		Nature	Statements suggesting climate change is a natural phenomenon. An act of nature.
Signs/Indicators: *Changes or developments in the study site that interviewee's associate with climate change. Include: sign/indicators; attribution of cause and effect; exclude: references to responses/remedies (climate action).*	13	Climate	Changes in rainfall, temperature, sunshine in the long-term (exceeding 10years). Include trans-generational justifications.
		Coastal Erosion	Erosion at shore, riverbanks and other waterbodies; exclude references to sea wall (code as climate action).
		Coral Health	Coral health and population.
		Crop Yield/Soil Health	Soil fertility/suitability and quality of yields.
		Fish Stock	Availability and accessibility of protein sources (fish, crab, lobster, Fijidoma maculata etc.) from waterbodies (rivers, sea, lakes, streams).

		Forest Fires	Forest fires
		Health	Non-lifestyle diseases and health complications attributed to climate change. Code lifestyle references e.g. diabetes as falsehood.
		Pollution	Self-referential.
		Sea Level Rise	References to the rise in sea level.
		Socio-Cultural Change	Changes in cultural practices or patterns, communal cohesion directly attributed to climate change.
		Soil Erosion	Exclude erosion associated with coasts river banks and land near tributaries.
		Water	Availability and accessibility of water. Potability not a factor.
		Weather	Any reference to changes in rainfall, temperature, sunshine in the short-term.
Project Perception: *How interviewees view the project.*	4	Mixed - 1	Interviewee expresses ambivalence about the project overall i.e. offers both positive and negative views about the project overall with cons/pros ratios not exceeding 3:1 in either direction.
		Negative 1	Explicitly negative perception of the project overall. Do not include itemization of pros and cons unless disproportionate (3:1 and above for cons). Exclude expressions juxtaposing pros and cons, and ambivalence.
		Neutral - 1	Interviewee is ambivalent about the project overall and offers non-committal responses. Exclude presentation of pros and cons.
		Positive-1	Explicitly positive perception of the project overall. Include itemization of pros and cons above 3:1 for pros.
Motive for Action: *Why people participate in climate adaptive activities or care about climate change.*	7	Children	Children in general. Exclude references to offsprings or children in respondent's care.
		Communal Obligation	Deference to communal harmony, the authority of traditional leaders/village structures.
		Community/Village	For the community. Exclude obligatory sentiments attributed to traditional structures or peer pressure.
		God/Religion	Statements of stewardship/guardianship, divine order, scriptural dictate or prescription.
		National	In the interest of the nation.
		Self/Offsprings	For self and/or respondent's own children/children in their care.
		World	For the world.
Climate Leadership: *Articulation of who should take charge of or lead climate change activities in the study site.*	12	Community/Village	Preference for collective primary leadership by the community/village.
		Elders	Preference for collective primary leadership by elders (generally retired villagers). Age is the consequential factor. Exclude references to those on village councils or marked by status of customary significance, except head of a clan (cluster of families).
		Exemplary Females	Preference for primary leadership by exemplary females within the village.
		Exemplary Group	Preference for primary leadership by exemplary group(s) within the village.
		Exemplary Men	Preference for primary leadership by exemplary men within the village.

		Exemplary Person	Preference for primary leadership by exemplary person(s) within the village.
		External	Preference for primary leadership by competent groups and/or individuals from outside the village.
		Family	Preference for primary leadership by families within the village.
		Self	Self specification for primary leadership within the village.
		Teachers	Preference for primary leadership by teachers within the village.
		Traditional Structures	Preference for primary leadership through traditional structures within the village. Village council/traditional leader/customary authority figure: Alcalde, Turaga ni Koro, Village Headman, Chief etc. Exclude family heads.
		Youth	Preference for primary leadership by folks within the village who are below 30 years old.
****Traditional Practices**	3	Farming	Techniques, patterns, and practices employed for more than four generations.
		Roles and Activities	Gendered, age, and customary status associated roles, responsibilities and actions.
		Traditional Knowledge	General insights on life and coping mechanisms attributed to forbearers (above four generations).
Project Outcomes	2	Failure/Shortcoming	Unmet objectives and goals. Include unintended negative outcomes.
		Success	Objectives and goals met. Include unintended gains.
Climate Change Agency: *Perspectives on what, if anything, their community or others can do to stop or limit the impacts of climate change.*	8	Failed Actions	Local efforts have been insufficient or outright failures.
		Fatalism	Nothing can be done. Include itemization of pros and cons above 3:1 for cons.
		Mixed - Agency	Expressions of ambivalence about what can be done, and how much it can or will change. Includes both positive and negative expressions with con/pros ratios not exceeding 3:1 in either direction.
		Nature 2 - Agency	Nature is ordering the course of events. Nature is out of our control.
		None	Interviewee does not know or did not respond. Exclude: non-committal responses and ambivalence.
		Optimism	Positive expressions about the possibility of taking actions that can stop, manage or cope amidst climate change. Include itemization of pros and cons above 3:1 for pros.
		Religious	Divine intervention is needed to stop it, indicate what should be done to stop it or help people to cope
		Resource Gaps	Knowledge level, availability of money or equipment is cited as a hindrance to knowing what and how to respond to climate change.
Angsts: Issues identified as primary community challenges and difficulties in general (all codes except those with the numerical denotation - 1) and the ranking of angsts against climate change as a primary challenge (with the denotation - 1).	55	Afforestation	
		Ageing	
		CC Impact	
		CC Impact - 1	
		Chemical Use/Industrial Activity	

All Angsts are self-referential.		Distillery Cost	
		Drainage	
		Education	
		Education -1	
		Electricity	
		Electricity - 1	
		Evacuation Centre	**ALL ANGSTS ARE SELF-REFERENTIAL.**
		Fertilizer Cost	
		Fevers and Diseases	
		Flooding	
		Flooding - 1	
		Food Security	
		Food Security - 1	
		Health Centre	
		Health Centre - 1	
		Housing	
		Housing - 1	
		Ice Plant	
		Income	
		Income - 1	
		Land	
		Land Rights	
		Land Rights - 1	
		Leadership and Harmony	
		Leadership and Harmony - 1	
		Lifestyle	
		Local Institutions	
		Market Access	
		Money Lenders	
		Over Population	
		Poisoning Fish	
		Poverty	
		Rate of Action	
		Relocation	
		Road	
		Sanitation	
		Sanitation -1	
		Sea Wall Construction	
		Sea Wall Construction - 1	
		Storage Facility	

		Streetlights	
		Transport -1	
		Transport	
		Undeclared – 1	
		Village Issues – 1	
		Water Scarcity	
		Water Scarcity -1	
		Wild Animals	
		Wild Animals -1	
		Work	
Project Action and Causes Profiled	1	A&C Profiled	Any climate change activity and causes of climate change stated in the project proposal and reports.
Climate Action: *Activities underway in the village/field site that interviewees describe/identify as climate change responses. Include description of how they mobilize.*	18	Agroforestry	Reference to agricultural activities incorporating the cultivation and conservation of trees. Only include when done on personal or an individually owned farm.
		Bee-keeping	References to participation in bee-keeping.
		Bird Conservation/Tracking	References to participation in bird conservation and tracking.
		Crop Diversification	Introduction of new crops (and new varieties).
		Filters & Water Supply	Reference to the introduction of water filters and improved water supply. Oriented towards domestic use.
		Hydropower	References to introduction of hydropower. Generation of power from dams/water bodies.
		Inaction	References to the absence of action on climate change in the village. Include: Statements about little or no mention of what climate change is and how it affects the area during the intervention.
		Irrigation	Water supply for agricultural purposes.
		Land Development	Land preparation techniques/land utilization optimization. Exclude references to soil improvement e.g. fertilizers.
		Multi-Cropping & Seed Dispersal	Dispersal of seedlings of the same variety range available in the area.
		Planting Trees/Afforestation	Exclude Sandalwood (type of tree) or commercial forestry, and planting of trees along riverbanks. Exclude planting trees on personal farms (agroforestry).
		River Buffer	Activities to prevent rivers overflowing their banks. Include tree planting along riverbanks.
		Sandalwood	Include general commercial forestry activities. Sandalwood is a type of tree planted for commercial purposes.
		School/General Clean Up	References to school and general anti-litter activities.
		Sea Wall	Construction of marine barriers with stones, cement and other solid materials. Exclude mangrove planting.
		Soil Enhancement	Specific focus on soil improvement. Exclude general land preparation activities.
		Taboo/No Take	All references to no fishing periods and zones or period and areas of managed access.

		Teri Planting	The planting of mangroves along marine areas.
Groupless	6	Community Mobilization	Descriptions of how communities organize to take action on climate change.
		Context	Descriptions of the socio-economics of the field country and/or site.
		COP	References to awareness about the annual Conference of the Parties.
		Country Risk	References to the risk profile of a field country.
		FSC	References to the Fiji Sugar Cooperation.
		1.5	References to awareness about the 1.5˚C to Stay Alive campaign.
Total Codes	173		
Codes in Multiple Groups	2	God/Religion	
		Community/Village	
Contextual Codes	8	Coded only for context about the project, ** where contextual information is cultural and obtained from interviewees.	
Non-functional	1	No significant difference in educational attainment or exposure. Only noted where exceptional cases arise.	

Appendix B: Codebook India

Code Group	Total Codes	Discrete Codes	Change Notations
Project Framework: *Theoretical or programmatic approach used by the project.*	1	Framework	
Climate Knowledge Acquisition: *When and where interviewees learnt about climate change.*	6	Before project	
		Holy Book	
		News	
		Observation	
		Project Intervention	
		School	
Climate Risk: *Perception of vulnerability and relative vulnerability in relation to self, community and livelihoods.*	7	Children-2	
		Coastal Dwellers - Self	
		Elderly	
		Equal Risk	
		Farmer - 2	
		Me	Altered from self in Fiji
		Women - 2	
Personal Inclusion/Influence: *The project's level of inclusion per interviewee's perception and experience of engagement with project leadership, key functionaries, as well as views on how well the project reflects community priorities.*	5	Mixed - 2	
		Negative 2	
		Neutral - 2	
		Positive 2	
		Youth Consultation	
Belief Progression: *How long it took interviewees to accept/repose confidence in the project intervention.*	2	Immediate	
		Progressive	
Project Activities: *Activities the project implemented in the study site.*	1	Project Activities	Activities the project implement in the study site. Coded to identify which has resonance with the study population. Applicable to project documents only.
Gender	2	Female	
		Male	
Schooling: *Interviewee's level of education.*	4	None	
		Post-Secondary	
		Primary	
		Secondary	
Knowledge: *Statements linking climate change cause and effect; indicators and practices.*	5	A Posteriori	
		Experiential	
		Falsehood	
		Knowledge Gap	
		Regurgitation	
Cause and Proximity: *Interviewees' proximal perception of climate change and it's degree of connection to them (cause/attribution of responsibility).*	6	God/Religion	
		Humans	
		International	
		Local	
		National	
		Nature	

Signs/Indicators: *Changes or developments in the study site that interviewee's associate with climate change. Include: sign/indicators; attribution of cause and effect; exclude: references to responses/remedies (climate action).*	13	Climate	
		Coastal Erosion	
		Coral Health	
		Crop Yield/Soil Health	
		Fish Stock	
		Crop Diversification	Moved to Climate Action while in India
		Health	
		Pollution	
		Sea Level Rise	
		Socio-Cultural Change	
		Soil Erosion	
		Water	
		Weather	
Project Perception: *How interviewee's view the project.*	4	Mixed - 1	
		Negative 1	
		Neutral - 1	
		Positive-1	
Motive for Action: *Why people participate in climate adaptive activities or care about climate change.*	7	Children	
		Communal Obligation	
		Community/Village	
		God/Religion	
		Nation	
		Self/Offsprings	
		World	
Climate Leadership: *Articulation of who should take charge of or lead climate change activities in the study site.*	6	Community/Village	
		Exemplary Person	
		External	
		Family	
		Self	
		Traditional Structures	
Traditional Practices	3	Farming	
		Roles and Activities	
		Traditional Knowledge	
Project Outcomes	2	Failure/Shortcoming	
		Success	
Climate Change Agency: *Perspectives on what, if anything, their community or others can do to stop or limit the impacts of climate change.*	8	Failed Actions	
		Fatalism	
		Mixed - Agency	
		Nature 2 - Agency	
		None	
		Optimism	
		Religious	
		Resource Gaps	
Angsts: Issues identified as primary community challenges and difficulties in general (all codes except those with the	38	Afforestation	
		Ageing	
		CC Impact	
		CC Impact - 1	
		Distillery Cost	

numerical denotation - 1) and the ranking of angsts against climate change as a primary challenge (with the denotation - 1)**. All Angsts are self-referential.**		Education	
		Education -1	
		Electricity	
		Electricity - 1	
		Evacuation Centre	
		Fertilizer Cost	
		Flooding	
		Flooding - 1	
		Food Security	
		Food Security - 1	
		Health Centre	
		Health Centre - 1	
		Housing	
		Housing - 1	
		Ice Plant	
		Income	
		Income - 1	
		Lifestyle	
		Market Access	
		Poisoning Fish	
		Rate of Action	
		Relocation	
		Road	
		Sanitation	
		Sanitation -1	
		Sea Wall Construction	
		Sea Wall Construction - 1	
		Transport -1	
		Transport	
		Water Scarcity	
		Water Scarcity -1	
		Wild Animals	
		Wild Animals -1	
Project Action and Causes Profiled	1	A&C Profiled	
Climate Action: *Activities underway in the village/field site that interviewees describe/identify as climate change responses. Personal involvement is not required. Include descriptions of how they mobilize.*	7	Agroforestry	
		Inaction	
		Planting Trees/Afforestation	
		Sandalwood	
		Sea Wall	
		Taboo/No Take	
		Teri Planting	
Groupless	6	Community Mobilization	
		Context	
		COP	
		Country Risk	
		FSC	
		1.5	
Total Codes	134		
Codes in Multiple Groups	2	God/Religion	
		Community/Village	
Codes that later changed groups	1	Crop Diversification	

Appendix C: Codebook India-Belize

Code Group	Total Codes	Discrete Codes	Change Notations
Project Framework: *Theoretical or programmatic approach used by the project.*	1	Framework	
Climate Knowledge Acquisition: *When and where interviewees learnt about climate change.*	11	Before project	
		Catholic Church	
		Extreme Event	
		Friends/Peers/Relatives	Friends/Relatives added in India; evolved further with Relatives in Belize
		Holy Book	
		News	
		Never Heard of Climate Change	
		Observation	
		Project Intervention	
		School	
		Village Meeting	
Climate Risk: *Perception of vulnerability and relative vulnerability in relation to self, community and livelihoods.*	9	Children-2	
		Coastal Dwellers - Self	
		Coastal/Riverside Dwellers	Evolved.
		Elderly	
		Equal Risk	
		Farmer - 2	
		Hillside Dwellers	
		Me	Altered from self in Fiji.
		Women - 2	
Personal Inclusion/Influence: *The project's level of inclusion per interviewee's perception and experience of engagement with project leadership, key functionaries, as well as views on how well the project reflects community priorities.*	5	Mixed - 2	
		Negative 2	
		Neutral - 2	
		Positive 2	
		Youth Consultation	
Belief Progression: *How long it took interviewees to accept/repose confidence in the project intervention.*	2	Immediate	
		Progressive	
Project Activities: *Activities the project implemented in the study site.*	1	Project Activities	Activities the project implement in the study site. Coded to identify which has resonance with the study population. Applicable to project documents only.
Gender	2	Female	
		Male	
Schooling:	4	None	

Interviewee's level of education.		Post-Secondary	
		Primary	
Knowledge: *Statements linking climate change cause and effect; indicators and practices.*	5	A Posteriori	
		Experiential	
		Falsehood	
		Knowledge Gap	
		Regurgitation	
Cause and Proximity: *Interviewees' proximal perception of climate change and it's degree of connection to them (cause/attribution of responsibility).*	6	God/Religion	
		Humans	
		International	
		Local	
		National	
		Nature	
Signs/Indicators: *Changes or developments in the study site that interviewee's associate with climate change. Include: sign/indicators; attribution of cause and effect; exclude: references to responses/remedies (climate action).*	13	Climate	Crop diversification moved to climate change action while in India.
		Coastal Erosion	
		Coral Health	
		Crop Yield/Soil Health	
		Fish Stock	
		Forest Fires	
		Health	
		Pollution	
		Sea Level Rise	
		Socio-Cultural Change	
		Soil Erosion	
		Water	
		Weather	
Project Perception: *How interviewee's view the project.*	4	Mixed - 1	
		Negative 1	
		Neutral - 1	
		Positive-1	
Motive for Action: *Why people participate in climate adaptive activities or care about climate change.*	7	Children	
		Communal Obligation	
		Community/Village	
		God/Religion	
		Nation	
		Self/Offsprings	
		World	
Climate Leadership: *Articulation of who should take charge of or lead climate change activities in the study site.*	12	Community/Village	
		Elders	
		Exemplary Females	

		Exemplary Group	
		Exemplary Men	
		Exemplary Person	
		External	
		Family	
		Self	
		Teachers	
		Traditional Structures	
		Youth	
Traditional Practices	3	Farming	
		Roles and Activities	
		Traditional Knowledge	
Project Outcomes	2	Failure/Shortcoming	
		Success	
Climate Change Agency: *Perspectives on what their community or others can do to stop or limit the impacts of climate change.*	8	Failed Actions	
		Fatalism	
		Mixed - Agency	
		Nature 2 - Agency	
		None	
		Optimism	
		Religious	
		Resource Gaps	
Angsts: Issues identified as primary community challenges and difficulties in general (all codes except those with the numerical denotation - 1) and the ranking of angsts against climate change as a primary challenge (with the denotation - 1). **All Angsts are self-referential.**	55	Afforestation	
		Ageing	
		CC Impact	
		CC Impact - 1	
		Chemical Use/Industrial Activity	
		Distillery Cost	
		Drainage	
		Education	
		Education -1	
		Electricity	
		Electricity - 1	
		Evacuation Centre	
		Fertilizer Cost	
		Fevers and Diseases	
		Flooding	
		Flooding - 1	
		Food Security	
		Food Security - 1	

		Health Centre	
		Health Centre - 1	
		Housing	
		Housing - 1	
		Ice Plant	
		Income	
		Income - 1	
		Land	
		Land Rights	
		Land Rights - 1	
		Leadership and Harmony	
		Leadership and Harmony - 1	
		Lifestyle	
		Local Institutions	
		Market Access	
		Money Lenders	
		Over Population	
		Poisoning Fish	
		Poverty	
		Rate of Action	
		Relocation	
		Road	
		Sanitation	
		Sanitation -1	
		Sea Wall Construction	
		Sea Wall Construction - 1	
		Storage Facility	
		Streetlights	
		Transport -1	
		Transport	
		Undeclared - 1	
		Village Issues - 1	
		Water Scarcity	
		Water Scarcity -1	
		Wild Animals	
		Wild Animals -1	
		Work	
Project Action and Causes Profiled	1	A&C Profiled	
Climate Action: *Activities underway in the village/field site that*	18	Agroforestry	
		Bee-keeping	

interviewees describe/identify as climate change responses. Personal involvement is not required. Include descriptions of how they mobilize.		Bird Conservation/Tracking	
		Crop Diversification	
		Filters & Water Supply	
		Hydropower	
		Inaction	
		Irrigation	
		Land Development	
		Multi-Cropping & Seed Dispersal	
		Planting Trees/Afforestation	
		River Buffer	
		Sandalwood	
		School/General Clean Up	
		Sea Wall	
		Soil Enhancement	
		Taboo/No Take	
		Teri Planting	
Groupless	6	Community Mobilization	
		Context	
		COP	
		Country Risk	
		FSC	
		1.5	
Total Codes	173		
Codes in Multiple Groups	2	God/Religion	
		Community/Village	
Codes Added in India	**23**		
Codes Added in Belize	**11**		
Evolved from Fiji to India	1		
Evolved from India to Belize	1		
Evolved from Fiji to Belize	0		

Appendix D: Field Countries and Associated Project and Village Subsets

Country	Project Name	Implementer	Funder	Village	Village Subset
Fiji	The Vanouso Tikina Project	ICA Prof. Joeli Veitayaki w/Village	Assorted & Local	Malawai	Gau Island
	The Vanouso Tikina Project	ICA Prof. Joeli Veitayaki w/Village	Assorted & Local	Lamiti	Gau Island
	Coastal Community Adaptation Project (C-CAP)	PaCE-SD	United States Agency for International Development (USAID)	Yaqaga	Yaqaga Island
	European Union Global Climate Change Aalliance (EU-GCCA)	PaCE-SD	European Union	Navai	Seaqaqa
	European Union Global Climate Change Aalliance (EU-GCCA)	PaCE-SD	European Union	Navundi	Seaqaqa
	European Union Global Climate Change Aalliance (EU-GCCA)	PaCE-SD	European Union	Rokosalase	Seaqaqa
India	Forest Forever! Forests Ecosystem	Laya	Assorted, mainly local	Munagalapudi	Laya
	Forest Forever! Forests Ecosystem	Laya	Assorted, mainly local	Polusumamaidi	Laya
	Forest Forever! Forests Ecosystem	Laya	Assorted, mainly local	Nelloikota	Laya
	PRAGATI-CARE Sustainable Tribal Empowerment Project (PRAGATI-CARE-STEP)	*PRAGATI	CARE-India	Agraham	PRAGATI
	PRAGATI-CARE Sustainable Tribal Empowerment Project (PRAGATI-CARE-STEP)	*PRAGATI	CARE-India	Sunaladana	PRAGATI
	PRAGATI-CARE Sustainable Tribal Empowerment Project (PRAGATI-CARE-STEP)	*PRAGATI	CARE-India	Palem	PRAGATI
	PRAGATI-CARE Sustainable Tribal Empowerment Project (PRAGATI-CARE-STEP)	*PRAGATI	CARE-India	Itikalakota	PRAGATI
Belize	Building Climate Change Resilience in Rural Communities in the Maya Golden Landscape ("The Ya'axche Project")	Ya'axche	UK-DFID	Trio	Ya'axche
	Building Climate Change Resilience in Rural Communities in the Maya Golden Landscape ("The Ya'axche Project")	Ya'axche	UK-DFID	Indian Creek	Ya'axche
	Building Climate Change Resilience in Rural Communities in the Maya Golden Landscape ("The Ya'axche Project")	Ya'axche	UK-DFID	San Miguel	Ya'axche
	Cohune Palm Nut Renewable Energy Project (Cohune Palm Nut Project)	CCCCC	European Union, and assorted	Flowers Bank	CCCCC
Notations					
*Implemented with the Integrated Tribal Development Agency (ITDA) and various Community Based Organizations					

Appendix E: Fiji Sample Profile – Village Level Data

Village/ Project Subset	Cohort	Interview Format	Malawai Village	Lamiti Village	Total	Gender Totals	Gender Rates
Gau Island	OW	FG	8	7	15	28	52%
	YW	FG	6	7	13		
	YM	FG	4	4	8	26	48%
	OM	INDV.	7	11	18		
Total Sample			25	29	54	54	100%

Village Population	141	228	369
Village Adult Population	79	124	203
Sample: Adult Pop Rate**	32%	23%	27%
Total Households	42	53	95
Households Sampled	23	26	49
Household Sample Rate	55%	49%	52%

**The targeted study population did not include children

Village/ Project Subset	Cohort	Interview Format	Navai	Navundi	Rokosalase	Total	Gender Totals	Gender Rates
Seaqaqa	OW	FG	5	1	1	7	13	43%
	OW	FG	0	4	1	5		
	OW	INDV.	0	0	1	1		
	YW	-	0	0	0	0		
	YM	INDV.	1			1	17	57%
	YM	FG	0	0	3	3		
	OM	FG	1	3	0	4		
	OM	FG	0	0	3	3		
	OM - Prob	FG	2	1	1	4		
	OM	INDV.	2	2	2	6		
Total Sample***			9	10	11	30	30	100%

Village Population	-	-	-	-
Village Adult Population	25	26	36	87
Sample: Adult Pop Rate**	36%	38%	31%	34%
Total Households	28	29	6	63
Households Sampled	26	27	5	58
Household Sample Rate	93%	93%	83%	92%

**The targeted study population did not include children

*** Sample reflects ethnic distribution: Navai (except 1) and Navundi: Indo-Fijian

OM - Prob: Not included in sample total and associated calculations. Includes a subset of individual interviewees for probity (Prob).

Village/ Project Subset	Cohort	Interview Format	Total	Gender Totals	Gender Rates
Yaqaga Island	OW	FG	5	8	38%
	YW	FG	2		
	YW	INDV.	1		
	YM	FG	5	13	62%
	OM	FG	8		
	OM	INDV	1		
Total Sample			21	21	100%

Village Population	157
Village Adult Population	42
Sample: Adult Pop Rate**	50%
Total Households	38
Households Sampled	19
Household Sample Rate	50%

**The targeted study population did not include children.

Appendix F: India Sample Profile – Village Level Data

Village/ Project Subset	Cohort	Interview Format	Munagalapudu	Polusumamaidi	Nellikota	Total	Gender Totals	Gender Rates
Laya	OW	FG	3	4	6	13	19	40%
	YW	FG	3	3	0	6		
	YM	FG	3	3	6	12	29	60%
	OM	FG	6	5	6	17		
Total Sample***			15	15	18	48	48	100%

Village Population	-	-	-	-
Village Adult Population	69	139	69	277
Sample: Adult Pop Rate**	22%	11%	26%	17%
Total Households	19	39	9	67
Households Sampled	9	15	6	30
Household Sample Rate	47%	38%	67%	45%

**The targeted study population did not include children.

Population and Household Data Source: Laya Foundation.

Village/ Project Subset	Cohort	Interview Format	Agraharam	Sunaladana	Palem	Itikalakota	Total	Gender Totals	Gender Rates
PRAGATI	OW	FG	5	4	6	5	15	36	49%
	YW	FG	4	3	4	5	11		
	YM	FG	5	3	6	5	14	37	51%
	OM	FG	4	4	6	4	14		
Total Sample***			18	14	22	19	73	73	100%

Village Population	-	-	-	-	-
Village Adult Population	92	92	92	92	368
Sample: Adult Pop Rate**	20%	15%	24%	21%	20%
Total Households	22	22	22	22	66
Households Sampled	8	6	10	8	32
Household Sample Rate	36%	27%	45%	36%	48%

**The targeted study population did not include children

Population and Household Data Source: No available population data. Population calculated based on the average for Laya Villages (92). Households calculated using average in Laya Villages (22). Both set of villages are drawn from a similarly composed communal, geographic and ethnic environment.

Appendix G: Belize Sample Profile – Village Level Data

Village/ Project Subset	Cohort	Interview Format	Trio	Indian Creek	San Miguel	Total	Gender Totals	Gender Rates
Ya'axché	OW	FG	3	4	4	11	26	47%
	YW	FG	5	6	4	15		
	YM	FG	4	4	4	12	29	53%
	OM	FG	5	5	3	13		
	OM-Prob	FG	4	0	0	4		
Total Sample			**21**	**19**	**15**	**55**	**55**	**100%**

Village Population	899	721	537	2157
Village Adult Population	376	268	192	836
Sample: Adult Pop Rate**	6%	7%	8%	7%
Total Households	188	134	96	418
Households Sampled	21	19	15	55
Household Sample Rate	11%	14%	16%	13%

**The targeted study population did not include children.

Population and Household Data Source: Belize National Census, 2010, p. 69-70).
*** No age-based disaggregated data available for village level populations. Figures calculated using the district average of two per household.

Village/ Project Subset	Cohort	Interview Format	Total	Gender Totals	Gender Rates
Flowers Bank	OW	FG	7	11	58%
	YW	FG	4		
	YM	FG	4	8	42%
	OM	FG	4		
Total Sample			**19**	**19**	**100%**

Village Population	121
Village Adult Population	62
Sample: Adult Pop Rate**	31%
Total Households	31
Households Sampled	15
Household Sample Rate	48%

**The targeted study population did not include children

Population and Household Data Source: Belize National Census, 2010, p. 69-70).
*** No age-based disaggregated data available for village level populations. Figures calculated using the district average of two per household.

Appendix H.1: Belief Progression Macro-Group Data – Gau Island, Fiji

Gau Subset	**Immediate**	**Progressive**
OM Malawai (I)	2	2
OW Malawai	0	0
YW Malawai	0	0
YM Malawai	0	1
YW Lamiti	0	0
YM Lamiti	1	0
YW Lamiti	4	1
OM Lamiti	7	6
Subset Totals	**14**	**10**
Gau Island Cohorts	**Immediate**	**Progressive**
OM	9	8
OW	0	0
YM	1	1
YW	4	1
Men	10	9
Women	4	1
Youth	5	2
Elders	9	8

Appendix H.2: Project Perception Macro-Group Data – Gau Island, Fiji

Gau Subset	**Mixed - 1**	**Negative - 1**	**Neutral - 1**	**Positive - 1**
OM Malawai (I)				10
OW Malawai	0	0	0	2
YW Malawai	0	0	0	3
YM Malawai	0	0	0	5
YW Lamiti	0	0	0	3
YM Lamiti	0	0	0	2
YW Lamiti	0	0	0	3
OM Lamiti	1			22
Subset Totals	**1**	**0**	**0**	**50**
Gau Island Cohorts	**Mixed - 1**	**Negative 1**	**Neutral - 1**	**Positive 1**
OM	1	0	0	32
OW	0	0	0	5
YM	0	0	0	7
YW	0	0	0	6
Men	1	0	0	39
Women	0	0	0	11
Youth	0	0	0	13
Elders	1	0	0	37

Appendix H.3: Personal Inclusion and Influence Macro-Group Data – Gau Island, Fiji

Gau Subset	**Mixed - 2**	**Negative - 2**	**Neutral - 2**	**Positive - 2**	**Youth Consultation**
OM Malawai (I)				10	
OW Malawai	0	0	0	0	0
YW Malawai	0	0	0	2	0
YM Malawai	0	0	0	0	2
YW Lamiti	0	0	0	3	0
YM Lamiti	0	0	5	0	0
YW Lamiti	0	0	0	1	0
OM Lamiti				9	
Subset Totals	**0**	**0**	**5**	**25**	**2**
Gau Island Cohorts	**Mixed - 2**	**Negative 2**	**Neutral - 2**	**Positive 2**	**Youth Consultation**
OM	0	0	0	19	0
OW	0	0	0	3	0
YM	0	0	5	0	2
YW	0	0	0	3	0
Men	0	0	5	19	2
Women	0	0	0	6	0
Youth	0	0	5	3	2
Elders	0	0	0	22	0

Appendix H.4: Climate Knowledge Macro-Group Data – Gau Island, Fiji

Gau Subset	A Posteriori	Experiential	Falsehood	Knowledge Gap	Regurgitation
OM Malawai (I)	13	1		3	2
OW Malawai	5	0	0	0	1
YW Malawai	3	0	0	0	0
YM Malawai	0	0	0	0	0
YW Lamiti	2	0	0	0	0
YM Lamiti	0	0	0	1	0
YW Lamiti	0	0	0	1	0
OM Lamiti	14	6		5	2
Gau Island Cohorts	**A Posteriori**	**Experiential**	**Falsehood**	**Knowledge Gap**	**Regurgitation**
OM	27	7	0	8	4
OW	7	0	0	0	1
YM	0	0	0	1	0
YW	3	0	0	1	0
Men	27	7	0	9	4
Women	10	0	0	1	1
Youth	3	0	0	2	0
Elders	34	7	0	8	5

Appendix H.5: Climate Knowledge Acquisition Macro-Group Data – Gau Island, Fiji

Gau Subset	Before project	Catholic Church	Extreme Event	Friends/Peers/ Relatives	Holy Book	Never Heard of Climate Change	News	Observation	Project Intervention	School	Village Meeting
OM Malawai (I)	0	0					1	1	5		
OW Malawai	0	0	0	0	0	0	0	2	0	1	0
YW Malawai	0	0	0	0	1	0	0	0	0	2	0
YM Malawai	0	0	0	0	0	0	0	1	1	0	0
YW Lamiti	2	0	0	0	0	0	0	1	1	0	0
YM Lamiti	0	0	0	0	0	0	0	0	1	2	0
YW Lamiti	0	0	0	0	0	0	0	0	1	0	0
OM Lamiti	1	0					0	1	6	1	
Subset Totals	**3**	**0**	**0**	**0**	**1**	**0**	**1**	**6**	**15**	**6**	**0**
Gau Island Cohorts	**Before project**	**Catholic Church**	**Extreme Event**	**Friends/Peers/Relatives**	**Holy Book**	**Never Heard of Climate Change**	**News**	**Observation**	**Project Intervention**	**School**	**Village Meeting**
OM	1	0	0	0	0	0	1	2	11	1	0
OW	2	0	0	0	0	0	0	3	1	1	0
YM	0	0	0	0	0	0	0	1	2	2	0
YW	0	0	0	0	1	0	0	0	1	2	0
Men	1	0	0	0	0	0	1	3	13	3	0
Women	2	0	0	0	1	0	0	3	2	3	0
Youth	0	0	0	0	1	0	0	1	3	4	0
Elders	3	0	0	0	0	0	1	5	12	2	0

Appendix H.6: Signs and Indicators Macro-Group Data – Gau Island, Fiji

Gau Subset	Climate	Coastal Erosion	Coral Health	Crop Yield/ Soil Health	Fish Stock	Forest Fires	Health	Pollution	Sea Level Rise	Socio-Cultural Change	Soil Erosion	Water	Weather
OM Malawai (I)	3	5		15	12				5	8	6		6
OW Malawai	1	0	3	1	5	0	2	0	3	0	0	0	2
YW Malawai	0	1	1	3	5	0	0	0	3	0	2	0	2
YM Malawai	1	0	0	4	4	0	0	0	0	0	2	0	1
YW Lamiti	2	0	0	1	2	0	0	0	0	1	3	0	3
YM Lamiti	0	0	0	1	0	0	0	0	2	0	0	0	0
YW Lamiti	0	0	1	0	1	0	0	0	1	0	0	0	3
OM Lamiti		5	1	19	5		1		2		11		15
Subset Total	**7**	**11**	**6**	**44**	**34**	**0**	**3**	**0**	**16**	**9**	**24**	**0**	**32**
Gau Island Cohorts													
OM	3	10	1	34	17	0	1	0	7	8	17	0	21
OW	3	0	3	2	7	0	2	0	3	1	3	0	5
YM	1	0	0	5	4	0	0	0	2	0	2	0	1
YW	0	1	2	3	6	0	0	0	4	0	2	0	5
Men	4	10	1	39	21	0	1	0	9	8	19	0	22
Women	3	1	5	5	13	0	2	0	7	1	5	0	10
Youth	1	1	2	8	10	0	0	0	6	0	4	0	6
Elders	6	10	4	36	24	0	3	0	10	9	20	0	26

Appendix H.7: Climate Action Macro-Group Data – Gau Island, Fiji

Gau Subset	Agroforestry	Crop Diversification	Inaction	Irrigation	Land Development	Multi-Cropping & Seed Dispersal	Planting Trees /Afforestation	River Buffer	Sandalwood	Sea Wall	Soil Enhancement	Taboo/ No Take	Teri Planting
OM Malawai (I)		2					5		1	2		2	11
OW Malawai	0	0	0	0	0	0	0	0	0	1	0	0	3
YW Malawai	0	0	0	0	0	0	0	0	0	1	0	0	1
YM Malawai	0	0	0	0	0	0	1	0	0	2	0	1	1
YW Lamiti	0	0	0	0	0	0	0	0	0	0	0	0	1
YM Lamiti	0	0	0	0	0	0	0	0	0	2	0	2	0
YW Lamiti	0	0	0	0	0	0	0	0	0	0	0	0	1
OM Lamiti	0	0	0	0	0	0	8	0	0	7	0	8	15
Subset Totals	**0**	**2**	**0**	**0**	**0**	**0**	**14**	**0**	**1**	**15**	**0**	**13**	**33**
Gau Island Cohorts	**Agroforestry**	**Crop Diversification**	**Inaction**	**Irrigation**	**Land Development**	**Multi-Cropping & Seed Dispersal**	**Planting Trees /Afforestation**	**River Buffer**	**Sandalwood**	**Sea Wall**	**Soil Enhancement**	**Taboo/ No Take**	**Teri Planting**
OM	0	2	0	0	0	0	13	0	1	9	0	10	26
OW	0	0	0	0	0	0	0	0	0	1	0	0	4
YM	0	0	0	0	0	0	1	0	0	4	0	3	1
YW	0	0	0	0	0	0	0	0	0	1	0	0	2
Men	0	2	0	0	0	0	14	0	1	13	0	13	27
Women	0	0	0	0	0	0	0	0	0	2	0	0	6
Youth	0	0	0	0	0	0	1	0	0	5	0	3	3
Elders	0	2	0	0	0	0	13	0	1	10	0	10	30

Appendix H.8: Cause and Proximity Macro-Group Data – Gau Island, Fiji

Gau Subset	**God/Religion**	**Humans**	**International**	**Local**	**National**	**Nature**
OM Malawai (I)	7					
OW Malawai	0	0	0	0	0	0
YW Malawai	0	0	0	0	0	0
YM Malawai	0	0	0	0	0	0
YW Lamiti	0	0	0	0	0	0
YM Lamiti	0	0	0	0	0	0
YW Lamiti	0	0	0	0	0	0
OM Lamiti	1					
Subset Totals	**8**	**0**	**0**	**0**	**0**	**0**
Gau Island Cohorts	**God/Religion**	**Humans**	**International**	**Local**	**National**	**Nature**
OM	8	0	0	0	0	0
OW	0	0	0	0	0	0
YM	0	0	0	0	0	0
YW	0	0	0	0	0	0
Men	8	0	0	0	0	0
Women	0	0	0	0	0	0
Youth	0	0	0	0	0	0
Elders	8	0	0	0	0	0

Appendix H.9: Climate Risk Macro-Group Data – Gau Island, Fiji

Gau Subset	Children - 2	Coastal Dwellers - Self	Coastal/Riverside Dwellers	Elderly	Equal Risk	Farmer - 2	Hillside Dwellers	Me	Women - 2
OM Malawai (I)	1	2			4				
OW Malawai	0	1	1	0	4	0	0	0	0
YW Malawai	0	0	0	0	0	0	0	0	0
YM Malawai	0	0	0	0	0	0	0	0	0
YW Lamiti	0	0	0	0	1	1	0	0	1
YM Lamiti	0	0	0	0	1	0	0	0	0
YW Lamiti	0	0	0	0	1	0	0	0	0
OM Lamiti				2	5				
Subset Totals	**1**	**3**	**1**	**2**	**16**	**1**	**0**	**0**	**1**
Gau Island Cohorts	**Children - 2**	**Coastal Dwellers - Self**	**Coastal/Riverside Dwellers**	**Elderly**	**Equal Risk**	**Farmer - 2**	**Hillside Dwellers**	**Me**	**Women - 2**
OM	1	2	0	2	9	0	0	0	0
OW	0	1	1	0	5	1	0	0	1
YM	0	0	0	0	1	0	0	0	0
YW	0	0	0	0	1	0	0	0	0
Men	1	2	0	2	10	0	0	0	0
Women	0	1	1	0	6	1	0	0	1
Youth	0	0	0	0	2	0	0	0	0
Elders	1	3	1	2	14	1	0	0	1

Appendix H.10: Climate Agency Macro-Group Data – Gau Island, Fiji

Gau Subset	Failed Actions	Fatalism	Mixed - Agency	Nature 2 - Agency	None	Optimism	Religious	Resource Gaps
OM Malawai (I)	0	1	0	0	0	12	15	0
OW Malawai	0	0	0	0	0	9	0	0
YW Malawai	0	0	0	0	0	3	3	0
YM Malawai	0	0	0	0	0	2	0	0
YW Lamiti	1	0	0	0	0	1	0	0
YM Lamiti	0	0	0	0	0	0	0	0
YW Lamiti	0	0	0	0	0	1	0	0
OM Lamiti	2	2	0	0	0	24	0	1
Subset Totals	**3**	**3**	**0**	**0**	**0**	**52**	**18**	**1**
Gau Island Cohorts	**Failed Actions**	**Fatalism**	**Mixed - Agency**	**Nature 2 - Agency**	**None**	**Optimism**	**Religious**	**Resource Gaps**
OM	2	3	0	0	0	36	15	1
OW	1	0	0	0	0	10	0	0
YM	0	0	0	0	0	2	0	0
YW	0	0	0	0	0	4	3	0
Men	2	3	0	0	0	38	15	1
Women	1	0	0	0	0	14	3	0
Youth	0	0	0	0	0	6	3	0
Elders	3	3	0	0	0	46	15	1

Appendix H.11: Motive for Action Macro-Group Data – Gau Island, Fiji

Gau Subset	Children	Communal Obligation	Community/ Village	God/Religion	National	Self/Offsprings	World
OM Malawai (I)	6		5	7			
OW Malawai	0	0	1	0	0	2	0
YW Malawai	0	1	2	0	0	0	0
YM Malawai	0	0	0	0	0	0	0
YW Lamiti	0	0	0	0	0	0	0
YM Lamiti	0	0	1	0	0	0	0
YW Lamiti	1	0	0	0	0	0	0
OM Lamiti	3		5	1			
Subset Total	**10**	**1**	**14**	**8**	**0**	**2**	**0**
Gau Island Cohorts	**Children**	**Communal Obligation**	**Community/ Village**	**God/Religion**	**National**	**Self/Offsprings**	**World**
OM	9	0	10	8	0	0	0
OW	0	0	1	0	0	2	0
YM	0	0	1	0	0	0	0
YW	1	1	2	0	0	0	0
Men	9	0	11	8	0	0	0
Women	1	1	3	0	0	2	0
Youth	1	1	3	0	0	0	0
Elders	9	0	11	8	0	2	0

Appendix H.12: Climate Leadership Macro-Group Data – Gau Island, Fiji

Gau Subset	Community/ Village	Elders	Exemplary Females	Exemplary Group	Exemplary Men	Exemplary Person	External	Family	Self	Traditional Knowledge	Youth
OM Malawai (I)	5						0	3		8	
OW Malawai	1	0	0	0	0	0	0	1	0	0	0
YW Malawai	2	0	0	0	0	0	0	0	0	0	0
YM Malawai	0	0	0	0	0	0	0	0	0	0	0
YW Lamiti	0	0	0	0	0	0	0	0	0	0	0
YM Lamiti	1	0	0	0	0	0	0	0	1	0	0
YW Lamiti	0	0	0	0	0	0	0	0	0	0	0
OM Lamiti	5						1	1	2	7	
Subset Totals	**14**	**0**	**0**	**0**	**0**	**0**	**1**	**5**	**3**	**15**	**0**
Gau Island Cohorts	**Community/ Village**	**Elders**	**Exemplary Females**	**Exemplary Group**	**Exemplary Men**	**Exemplary Person**	**External**	**Family**	**Self**	**Traditional Knowledge**	**Youth**
OM	10	0	0	0	0	0	1	4	2	15	0
OW	1	0	0	0	0	0	0	1	0	0	0
YM	1	0	0	0	0	0	0	0	1	0	0
YW	2	0	0	0	0	0	0	0	0	0	0
Men	11	0	0	0	0	0	1	4	3	15	0
Women	3	0	0	0	0	0	0	1	0	0	0
Youth	3	0	0	0	0	0	0	0	1	0	0
Elders	11	0	0	0	0	0	1	5	2	15	0

Appendix I.1: Belief Progression Macro-Group Data – Yaqaqa Island, Fiji

Belief Progression	Gendered Cohorts				
	OM	**YM**	**OW**	**YW**	**OM Indv**
Immediate	1	0	1	0	
Progressive	0				
Totals	**1**	**0**	**1**	**0**	0
Macro-Group Belief Progression	**Men**	**Women**	**Youth**		
Immediate	1	1	0		
Progressive	0	0	0		
Totals	**1**	**1**	**0**		

Appendix I.2: Project Perception Macro-Group Data – Yaqaqa Island, Fiji

Project Perception	Gendered Cohorts				
	OM	**YM**	**OW**	**YW**	**OM Indv**
Mixed - 1	0	0	0	0	0
Negative 1	0				
Neutral - 1	0				
Positive 1	2				
Totals	**2**	**0**	**0**	**0**	

Macro-Group Project Perception	Men	Women	Youth
Mixed - 1	0	0	0
Negative 1	0	0	0
Neutral - 1	0	0	0
Positive 1	2	0	0
Totals	**2**	**0**	0

Appendix I.3: Personal Influence or Inclusion Macro-Group Data – Yaqaqa Island, Fiji

Personal Influence or Inclusion	Gendered Cohorts				
	OM	**YM**	**OW**	**YW**	**OM Indv**
Mixed - 2	0				
Negative 2					
Neutral - 2					
Positive 2			1		
Youth Consultation		1	0		
Totals	**0**	**1**	**1**	**0**	0

Macro-Group Personal Influence or Inclusion	**Men**	**Women**	**Youth**
Mixed - 2	0	0	0
Negative 2	0	0	0
Neutral - 2	0	0	0
Positive 2	0	1	0
Youth Consultation	1	0	1
Totals	1	1	1

Appendix I.4: Climate Change Knowledge Macro-Group Data – Yaqaqa Island, Fiji

	Gendered Cohorts				
Climate Knowledge	**OM**	**YM**	**OW**	**YW**	**OM Prob**
A Posteriori	1			2	0
Experiential					
Falsehood					
Knowledge Gap		1		1	
Regurgitation					
Totals	**1**	**1**	**0**	**3**	**0**

Macro-Group Climate Knowledge	**Men**	**Women**	**Youth**
A Posteriori	1	2	2
Experiential	0	0	0
Falsehood	0	0	0
Knowledge Gap	1	1	2
Regurgitation	0	0	0
Totals	**2**	**3**	**4**

Appendix I.5: Climate Knowledge Acquisition Macro-Group Data – Yaqaqa Island, Fiji

Climate Knowledge Acquisition	Gendered Cohorts				
	OM	**YM**	**OW**	**YW**	**OM Indv**
Before project	1				
Extreme Event					
Friends/Peers/Relatives					
Holy Book					
Never Heard of Climate Change					
News					
Observation	1				
Project Intervention	2				
School				2	1
Village Meeting					
Totals	**4**	**0**	**0**	**2**	**1**

Macro-Group Climate Knowledge Acquisition	**Men**	**Women**	**Youth**
Before project	1	0	0
Extreme Event	0	0	0
Friends/Peers/Relatives	0	0	0
Holy Book	0	0	0
Never Heard of Climate Change	0	0	0
News	0	0	0
Observation	1	0	0
Project Intervention	2	0	0
School	0	2	2
Village Meeting	0	0	0
Totals	**4**	**2**	**2**

Appendix I.6: Signs and Indicators Macro-Group Data – Yaqaqa Island, Fiji

Signs and Indicators	Gendered Cohorts				
	OM	YM	OW	YW	OM INDV
Climate	0				
Coastal Erosion	8			1	
Coral Health	2		1		
Crop Yield/Soil Health	2		1		1
Fish Stock	2		1	3	5
Forest Fires	0				
Health	0				
Pollution	0				
Sea Level Rise	0	3		1	
Socio-Cultural Change	0				
Soil Erosion	1	1	1	1	
Water	0				
Weather	2		3	3	3
Total	**17**	**4**	**7**	**9**	9

Macro-Group Signs and Indicators	Men	Women	Youth
Climate	0	0	0
Coastal Erosion	8	1	1
Coral Health	2	1	0
Crop Yield/Soil Health	2	1	0
Fish Stock	2	4	3
Forest Fires	0	0	0
Health	0	0	0
Pollution	0	0	0
Sea Level Rise	3	1	4
Socio-Cultural Change	0	0	0
Soil Erosion	2	2	2
Water	0	0	0
Weather	2	6	3
Total	**21**	**16**	**13**

Appendix I.7: Climate Action Macro-Group Data – Yaqaqa Island, Fiji

Gendered Climate Actions	Gendered Cohorts				
	OM	YM	OW	YW	OM Indv
Crop Diversification	0				
Hydropower					
Inaction					
Irrigation					
Multi-Cropping & Seed Dispersal					
Planting Trees/Afforestation					
River Buffer					
Sea Wall			1		
Soil Enhancement					
Taboo/No Take		1	2		4
Teri Planting					
Totals	**0**	**1**	**3**	**0**	4

Macro-Group Climate Actions	Men	Women	Youth
Crop Diversification	0	0	0
Hydropower	0	0	0
Inaction	0	0	0
Irrigation	0	0	0
Multi-Cropping & Seed Dispersal	0	0	0
Planting Trees/Afforestation	0	0	0
River Buffer	0	0	0
Sea Wall	0	1	0
Soil Enhancement	0	0	0
Taboo/No Take	1	2	1
Teri Planting	0	0	0
Totals	**1**	**3**	**1**

Appendix I.8: Cause and Proximity Macro-Group Data – Yaqaqa Island, Fiji

Cause and Proximity	Gendered Cohorts				
	OM	YM	OW	YW	OM Indv
God/Religion	0				
Humans	3				1
International	1				1
Local	1				1
National	0				
Nature	0				1
Totals	**5**	**0**	**0**	**0**	**4**

Macro-Group Cause and Proximity	Men	Women	Youth
God/Religion	0	0	0
Humans	3	0	0
International	1	0	0
Local	1	0	0
National	0	0	0
Nature	0	0	0
Totals	5	0	0

Appendix I.9: Climate Risk Macro-Group Data – Yaqaqa Island, Fiji

Climate Risk	Gendered Cohorts				
	OM	**YM**	**OW**	**YW**	**OM Indv**
Children - 2	0				
Coastal Dwellers - Self	0				
Coastal/Riverside Dwellers	0				
Elderly	0				
Equal Risk	2	1	1	1	0
Farmer - 2	0				
Hillside Dwellers	0				
Me	0				
Women - 2	0				
Totals	**2**	**1**	**1**	**1**	

Macro-Group Climate Risk	**Men**	**Women**	**Youth**
Children - 2	0	0	0
Coastal Dwellers - Self	0	0	0
Coastal/Riverside Dwellers	0	0	0
Elderly	0	0	0
Equal Risk	3	2	2
Farmer - 2	0	0	0
Hillside Dwellers	0	0	0
Me	0	0	0
Women - 2	0	0	0
Totals	**3**	**2**	**2**

Appendix I.10: Climate Change Agency Macro-Group Data – Yaqaqa Island, Fiji

	Gendered Cohorts				
Agency	**OM**	**YM**	**OW**	**YW**	**OM Indv**
Failed Actions	1				
Fatalism	2	1			
Mixed - Agency	0				
Nature 2 - Agency	0				
None	0				
Optimism	0	0	3	6	4
Religious	0				
Resource Gaps	0				
Totals	**3**	**1**	**3**	**6**	4

Macro-Group Agency	**Men**	**Women**	**Youth**
Failed Actions	1	0	0
Fatalism	3	0	1
Mixed - Agency	0	0	0
Nature 2 - Agency	0	0	0
None	0	0	0
Optimism	0	9	6
Religious	0	0	0
Resource Gaps	0	0	0
Totals	4	9	7

Appendix I.11: Motives for Action Macro-Group Data – Yaqaqa Island, Fiji

Motives	Gendered Cohorts				
	OM	**YM**	**OW**	**YW**	**OM Indv**
Children	0				
Communal Obligation					
Community/Village	0	0	0	2	0
God/Religion					
National					
Self/Offsprings					
World					
Totals	**0**	**0**	**0**	**2**	**0**

Macro-Group Motives	**Men**	**Women**	**Youth**
Children	0	0	0
Communal Obligation	0	0	0
Community/Village	0	2	2
God/Religion	0	0	0
National	0	0	0
Self/Offsprings	0	0	0
World	0	0	0
Totals	**0**	**2**	**2**

Appendix I.12: Climate Change Leadership Macro-Group Data – Yaqaqa Island, Fiji

Climate Leadership	Gendered Cohorts				
	OM	YM	OW	YW	OM Indv
Community/Village	0			2	
Elders					
Exemplary Females					
Exemplary Group					
Exemplary Men					
Exemplary Person					
External				1	
Family					1
Self					
Traditional Structures		1	1		1
Youth					
Totals	**0**	**1**	**1**	**3**	**2**

Macro- Group Climate Leadership	Men	Women	Youth
Community/Village	0	2	2
Elders	0	0	0
Exemplary Females	0	0	0
Exemplary Group	0	0	0
Exemplary Men	0	0	0
Exemplary Person	0	0	0
External	0	1	1
Family	0	0	0
Self	0	0	0
Traditional Structures	1	1	1
Youth	0	0	0
Totals	**1**	**4**	**4**

Appendix J.1: Belief Progression Macro-Group Data – Seaqaqa, Fiji

	Transcripts							
Codes	**D 40: Navail OM FG and Rokosalase OM FG**	**D 41: Seaqaqa OM FG (Probing Group) and Rokosalase YM**	**D 42: Older Women FG Navai + Navundi and Amit's Interview**	**D 43: Seaqaqa11 Interviews**	**Seaqaqa**	**Totals**		
Immediate	0	0	0	1	1	2		
Progressive	0	0	0	0	0	0		
Totals	**0**	**0**	**0**	**1**	**1**	**2**		
Codes	**Testing Group**	**OM Navai**	**OW Navai**	**OM Navundi**	**OW Navundi**	**OM Roko**	**OW Roko**	**YM Roko**
Immediate	0	0	0	1	0	0	0	0
Progressive	0	0	0	0	0	0	0	0
Totals	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
Codes	**Testing Group**	**OM**	**OW**	**YM**	**Indo Men**	**Indo Women**	**iTaukei Men**	**iTaukei Women**
Immediate	0	1	0	0	1	0	0	0
Progressive	0	0	0	0	0	0	0	0
Totals	0	1	0	0	1	0	0	0

Appendix J.2: Project Perception Macro-Group Data – Seaqaqa, Fiji

	Transcripts					
Codes	**D 40: Navail OM FG and Rokosalase OM FG**	**D 41: Seaqaqa OM FG (Probing Group) and Rokosalase YM**	**D 42: Older Women FG Navai + Navundi and Amit's Interview**	**D 43: Seaqaqa11 Interviews**	**Seaqaqa**	**Totals**
Mixed - 1	0	0	0	1	1	2
Negative 1	2	0	1	1	4	8
Neutral - 1	0	0	0	1	1	2
Positive 1	1	0	4	2	7	14
Totals	3	0	5	5	13	26

Codes	**Testing Group**	**OM Navai**	**OW Navai**	**OM Navundi**	**OW Navundi**	**OM Roko**	**OW Roko**	**YM Roko**
Mixed - 1				1				
Negative 1	2			1	1			
Neutral - 1								1
Positive 1	1	2	1		1	1	1	
Totals	**3**	**2**	**1**	**2**	**2**	**1**	**1**	**1**

Codes	**Testing Group**	**OM**	**OW**	**YM**	**Indo Men**	**Indo Women**	**iTaukei Men**	**iTaukei Women**
Mixed - 1	0	1	0	0	1	0	0	0
Negative 1	2	1	1	0	1	1	0	0
Neutral - 1		0	0	1	0	0	1	0
Positive 1	1	3	3	0	2	2	1	1
Totals	**3**	**5**	**4**	**1**	**4**	**3**	**2**	**1**

Appendix J.3: Perception of Inclusion and Influence Macro-Group Data – Seaqaqa, Fiji

Transcript

Codes	D 40: Navail OM FG and Rokosalase OM FG	D 41: Seaqaqa OM FG (Probing Group) and Rokosalase YM	D 42: Older Women FG Navai + Navundi and Amit's Interview	D 43: Seaqaqa11 Interviews	Seaqaqa	Totals
Mixed - 2	0	0	0	0	0	0
Negative 2	1	0	0	0	1	2
Neutral - 2	0	0	0	1	1	2
Positive 2	0	0	1	1	2	4
Youth Consultation	0	0	0	0	0	0
Totals	**1**	**0**	**1**	**2**	**4**	**8**

Codes	Testing Group	OM Navai	OW Navai	OM Navundi	OW Navundi	OM Roko	OW Roko	YM Roko
Mixed - 2								
Negative 2		1						
Neutral - 2								1
Positive 2		1				1		
Youth Consultation								
Totals	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**1**

Codes	Testing Group	OM	OW	YM	Indo Men	Indo Women	iTaukei Men	iTaukei Women
Mixed - 2	0	0	0	0	0	0	0	0
Negative 2	0	1	0	0	1	0	0	0
Neutral - 2	0	0	0	1	0	0	1	0
Positive 2	0	2	0	0	1	0	1	0
Youth Consultation	0	0	0	0	0	0	0	0
Totals	0	3	0	1	2	0	2	0

Appendix J.4: Climate Knowledge Macro-Group Data – Seaqaqa, Fiji

Transcript

Codes	D 40: Navail OM FG and Rokosalase OM FG	D 41: Seaqaqa OM FG (Probing Group) and Rokosalase YM	D 42: Older Women FG Navai + Navundi and Amit's Interview	D 43: Seaqaqa11 Interviews	Seaqaqa	Totals
A Posteriori	0	4	1	3	8	16
Experiential	0	0	1	0	1	2
Falsehood	0	0	0	0	0	0
Knowledge Gap	1	1	1	0	3	6
Regurgitation	0	0	0	0	0	0
Totals	**1**	**5**	**3**	**3**	**12**	**24**

Codes	Testing Group	OM Navai	OW Navai	OM Navundi	OW Navundi	OM Roko	OW Roko	YM Roko
A Posteriori	3			2	1	1		1
Experiential					1			
Falsehood								
Knowledge Gap					1	1		1
Regurgitation								
Totals	**3**	**0**	**0**	**2**	**3**	**2**	**0**	**2**

Codes	Testing Group	OM	OW	YM	Indo Men	Indo Women	iTaukei Men	iTaukei Women
A Posteriori	3	3	1	1	2	1	2	0
Experiential		0	1	0	0	1	0	0
Falsehood		0	0	0	0	0	0	0
Knowledge Gap		1	1	1	0	1	2	0
Regurgitation		0	0	0	0	0	0	0
Totals	**3**	**4**	**3**	**2**	**2**	**3**	**4**	**0**

Appendix J.5: Climate Knowledge Acquisition Macro-Group Data – Seaqaqa, Fiji

	Transcript					
Codes	**Navail & Roko OM FG**	**OM Probing + Roko YM**	**OW FG Navai + Navundi + AC**	**Seaqaqa 11**	**Seaqaqa**	**Totals**
Before project	0	0	0	0	0	0
Catholic Church	0	0	0	0	0	0
Extreme Event	0	0	0	0	0	0
Friends/Peers/Relatives	0	0	0	0	0	0
Holy Book	0	0	0	0	0	0
Never Heard of CC	0	0	0	0	0	0
News	0	0	1	0	1	2
Observation	0	0	0	0	0	0
Project Intervention	2	0	2	1	5	10
School	0	0	0	0	0	0
Village Meeting	0	0	0	0	0	0
Totals	**2**	**0**	**3**	**1**	**6**	**12**

Codes	**Testing Group**	**OM Navai**	**OW Navai**	**OM Navundi**	**OW Navundi**	**OM Roko**	**OW Roko**	**YM Roko**
Before project		2						
Catholic Church								
Extreme Event								
Friends/Peers/Relatives								
Holy Book								
Never Heard of CC								
News			1					
Observation								
Project Intervention		1	1	1				
School								
Village Meeting								
Totals	**0**	**3**	**2**	**1**	**0**	**0**	**0**	**0**

Codes	**Testing Group**	**OM**	**OW**	**YM**	**Indo Men**	**Indo Women**	**iTaukei Men**	**iTaukei Women**
Before project	0	2	0	0	2	0	0	0
Catholic Church	0	0	0	0	0	0	0	0
Extreme Event	0	0	0	0	0	0	0	0
Friends/Peers/Relatives	0	0	0	0	0	0	0	0
Holy Book	0	0	0	0	0	0	0	0
Never Heard of CC	0	0	0	0	0	0	0	0
News	0	0	1	0	0	1	0	0
Observation	0	0	0	0	0	0	0	0
Project Intervention	0	2	1	0	2	1	0	0
School	0	0	0	0	0	0	0	0
Village Meeting	0	0	0	0	0	0	0	0
Totals	0	4	2	0	4	2	0	0

Appendix J.6: Signs and Indicators Macro-Group Data – Seaqaqa, Fiji

Transcript

Codes	OM FGs Navail + Roko	OM Probing + Roko YM	OW FGs Navai + Navundi + AC	Seaqaqa 11	Seaqaqa	Totals
Climate	0	1	0	0	1	2
Crop Yield/Soil Health	5	6	8	7	26	52
Forest Fires	0	0	0	0	0	0
Health	0	0	0	0	0	0
Pollution	0	1	0	0	1	2
Sea Level Rise	1	0	0	0	1	2
Socio-Cultural Change	0	0	0	0	0	0
Soil Erosion	2	1	0	2	5	10
Water	8	7	18	21	54	108
Weather	5	4	7	7	23	46
Totals	**21**	**20**	**33**	**37**	**111**	**222**

Codes	OM Navai	OW Navai	OM Navundi	OW Navundi	OM Roko	OW Roko	YM Roko
Climate							1
Crop Yield/Soil Health	9	4	1	4	1	1	
Forest Fires							
Health							
Pollution							1
Sea Level Rise					1		
Socio-Cultural Change							
Soil Erosion	1				3		1
Water	14	3	12	8	4	2	1
Weather	7	2	2	2	2	1	3
Totals	**31**	**9**	**15**	**14**	**11**	**4**	**7**

Codes	OM	OW	YM	Indo Men	Indo Women	iTaukei Men	iTaukei Women
Climate	0	0	1	0	0	1	0
Crop Yield/Soil Health	11	9	0	10	8	1	1
Forest Fires	0	0	0	0	0	0	0
Health	0	0	0	0	0	0	0
Pollution	0	0	1	0	0	1	0
Sea Level Rise	1	0	0	0	0	1	0
Socio-Cultural Change	0	0	0	0	0	0	0
Soil Erosion	4	0	1	1	0	4	0
Water	30	13	1	26	11	5	2
Weather	11	5	3	9	4	5	1
Totals	57	27	7	46	23	18	4

Appendix J.7: Climate Action Macro-Group Data – Seaqaqa, Fiji

Transcripts	Codes	
	Inaction	**Totals**
D 40: Navail OM FG and Rokosalase OM FG	0	0
D 41: Seaqaqa OM FG (Probing Group) and Rokosalase YM	2	2
D 42: Older Women FG Navai + Navundi and Amit's Interview	2	2
D 43: Seaqaqa11 Interviews	2	2
Seaqaqa	6	6
Totals	**12**	**12**

Codes	**Testing Group**	**OM Navai**	**OW Navai**	**OM Navundi**	**OW Navundi**	**OM Roko**	**OW Roko**	**YM Roko**
Inaction	1	3	0	0	1	0	0	1

Codes	**Testing Group**	**OM**	**OW**	**YM**	**Indo Men**	**Indo Women**	**iTaukei Men**	**iTaukei Women**
Inaction	1	3	1	1	3	1	1	0

Appendix J.8: Cause and Proximity Macro-Group Data – Seaqaqa, Fiji

Transcripts

Codes	D 40: Navail OM FG and Rokosalase OM FG	D 41: Seaqaqa OM FG (Probing Group) and Rokosalase YM	D 42: Older Women FG Navai + Navundi and Amit's Interview	D 43: Seaqaqa11 Interviews	Seaqaqa	Totals
God/Religion	0	0	0	0	0	0
Humans	0	4	5	9	18	36
International	0	1	0	0	1	2
Local	0	2	1	0	3	6
National	0	0	0	0	0	0
Nature	0	0	0	0	0	0
Totals	**0**	**7**	**6**	**9**	**22**	**44**

Codes	Testing Group	OM Navai	OW Navai	OM Navundi	OW Navundi	OM Roko	OW Roko	YM Roko
God/Religion								
Humans	3	4	3	4		2		2
International	1							
Local	2				1			
National								
Nature								
Totals	**6**	**4**	**3**	**4**	**1**	**2**	**0**	**2**

Codes	Testing Group	OM	OW	YM	Indo Men	Indo Women	iTaukei Men	iTaukei Women
God/Religion		0	0	0	0	0	0	0
Humans	3	10	5	2	8	3	4	0
International	1	0	0	0	0	0	0	0
Local	2	0	1	0	0	1	0	0
National		0	0	0	0	0	0	0
Nature		0	0	0	0	0	0	0
Totals	**6**	10	6	2	8	4	4	0

Appendix J.9: Climate Risk Macro-Group Data – Seaqaqa, Fiji

Codes	Transcripts					
	Navail OM + Roko OM FG	**OM Probing + Roko YM**	**Older Women FG Navai + Navundi + AC**	**Seaqaqa 11**	**Seaqaqa**	**Totals**
Children - 2	0	0	0	0	0	0
Coastal Dwellers - Self	0	0	0	0	0	0
Coastal/Riverside Dwellers	0	0	0	0	0	0
Elderly	0	0	0	0	0	0
Equal Risk	0	1	1	2	4	8
Farmer - 2	0	0	0	4	4	8
Hillside Dwellers	0	0	0	0	0	0
Me	0	0	0	0	0	0
Women - 2	0	0	0	0	0	0
Totals	**0**	**1**	**1**	**6**	**8**	**16**

Codes	Testing Group	OM Navai	OW Navai	OM Navundi	OW Navundi	OM Roko	OW Roko	YM Roko
Children - 2								
Coastal Dwellers - Self								
Coastal/Riverside Dwellers								
Elderly								
Equal Risk		4		1		1		
Farmer - 2								1
Hillside Dwellers								
Me								
Women - 2								
Totals	**0**	**4**	**0**	**1**	**0**	**1**	**0**	**1**

Codes	Testing Group	OM	OW	YM	Indo Men	Indo Women	iTaukei Men	iTaukei Women
Children - 2	0	0	0	0	0	0	0	0
Coastal Dwellers - Self	0	0	0	0	0	0	0	0
Coastal/Riverside Dwellers	0	0	0	0	0	0	0	0
Elderly	0	0	0	0	0	0	0	0
Equal Risk	0	6	0	0	5	0	1	0
Farmer - 2	0	0	0	1	0	0	1	0
Hillside Dwellers	0	0	0	0	0	0	0	0
Me	0	0	0	0	0	0	0	0
Women - 2	0	0	0	0	0	0	0	0
Totals	**0**	**6**	**0**	**1**	**5**	**0**	**2**	**0**

Appendix J.10: Climate Change Agency Macro-Group Data – Seaqaqa, Fiji

Codes	Transcripts					Totals
	D 40: Navail OM FG and Rokosalase OM FG	**D 41: Seaqaqa OM FG (Probing Group) and Rokosalase YM**	**D 42: Older Women FG Navai + Navundi and Amit's Interview**	**D 43: Seaqaqa11 Interviews**	**Seaqaqa**	
Failed Actions	0	0	0	0	0	0
Fatalism	3	2	1	3	9	18
Mixed - Agency	0	0	0	1	1	2
Nature 2 - Agency	0	2	1	2	5	10
None	0	0	0	0	0	0
Optimism	7	7	6	11	31	62
Religious	3	0	1	1	5	10
Resource Gaps	1	0	0	0	1	2
Totals	**14**	**11**	**9**	**18**	**52**	**104**

Codes	Testing Group	OM Navai	OW Navai	OM Navundi	OW Navundi	OM Roko	OW Roko	YM Roko
Failed Actions								
Fatalism	2	3	2			1	1	
Mixed - Agency								
Nature 2 - Agency	2		3					
None								
Optimism	3	5	2	4	4	7	1	5
Religious		2	1			1	1	
Resource Gaps						1		
Totals	**7**	**10**	**8**	**4**	**4**	**10**	**3**	**5**

Codes	Testing Group	OM	OW	YM	Indo Men	Indo Women	iTaukei Men	iTaukei Women
Failed Actions	0	0	0	0	0	0	0	0
Fatalism	2	4	3	0	3	2	1	1
Mixed - Agency	0	0	0	0	0	0	0	0
Nature 2 - Agency	2	0	3	0	0	3	0	0
None	0	0	0	0	0	0	0	0
Optimism	3	16	7	5	9	6	12	1
Religious	0	3	2	0	2	1	1	1
Resource Gaps	0	1	0	0	0	0	1	0
Totals	**7**	**24**	**15**	**5**	**14**	**12**	**15**	**3**

Appendix J.11: Motive for Action Macro-Group Data – Seaqaqa, Fiji

Transcripts

Codes	OM FGs Navail + Roko	OM Probing + Roko YM	OW FGs Navai + Navundi + AC	Seaqaqa 11	Seaqaqa	Totals
Children	0	0	0	0	0	0
Communal Obligation	0	0	0	0	0	0
Community/ Village	0	2	0	1	3	6
God/Religion	0	0	0	0	0	0
Nation	0	0	0	0	0	0
Self/ Offsprings	0	0	0	0	0	0
World	0	0	0	0	0	0
Totals	**0**	**2**	**0**	**1**	**3**	**6**

Codes	Testing Group	OM Navai	OW Navai	OM Navundi	OW Navundi	OM Roko	OW Roko	YM Roko
Children				0				
Communal Obligation				1				
Community/ Village	2							
God/Religion								
Nation								
Self/ Offsprings								
World								
Totals	**2**	**0**	**0**	**1**	**0**	**0**	**0**	**0**

Codes	Testing Group	OM	OW	YM	Indo Men	Indo Women	iTaukei Men	iTaukei Women
Children		0	0	0	0	0	0	0
Communal Obligation		1	0	0	1	0	0	0
Community/ Village	2	0	0	0	0	0	0	0
God/Religion		0	0	0	0	0	0	0
Nation		0	0	0	0	0	0	0
Self/ Offsprings		0	0	0	0	0	0	0
World		0	0	0	0	0	0	0
Totals	**2**	**1**	**0**	**0**	**1**	**0**	**0**	**0**

Appendix J.12: Climate Change Leadership Macro-Group Data – Seaqaqa, Fiji

Transcripts

Codes	OM Navail & Roko FGS	OM Probing + Roko YM	OW FGs Navai + Navundi + AC	Seaqaqa 11	Seaqaqa	Totals
Community/Village	0	2	0	1	3	6
Elders	0	0	0	0	0	0
Exemplary Females	0	0	0	0	0	0
Exemplary Group	0	0	0	0	0	0
Exemplary Men	0	0	0	0	0	0
Exemplary Person	2	1	0	0	3	6
External	1	0	1	4	6	12
Family	0	0	0	0	0	0
Self	0	0	0	0	0	0
Traditional Structures	1	3	1	3	8	16
Youth	0	0	0	0	0	0
Totals	**4**	**6**	**2**	**8**	**20**	**40**

Codes	Testing Group	OM Navai	OW Navai	OM Navundi	OW Navundi	OM Roko	OW Roko	YM Roko
Community/Village	1			1				1
Elders								
Exemplary Females								
Exemplary Group								
Exemplary Men								
Exemplary Person		2						1
External		3		1		2		
Family								
Self								
Traditional Structures	1	1	2			1		3
Youth								
Totals	**2**	**6**	**2**	**2**	**0**	**3**	**0**	**5**

Codes	Testing Group	OM	OW	YM	Indo Men	Indo Women	iTaukei Men	iTaukei Women
Community/Village	1	1	0	1	1	0	1	0
Elders		0	0	0	0	0	0	0
Exemplary Females		0	0	0	0	0	0	0
Exemplary Group		0	0	0	0	0	0	0
Exemplary Men		0	0	0	0	0	0	0
Exemplary Person		2	0	1	2	0	1	0
External		6	0	0	4	0	2	0
Family		0	0	0	0	0	0	0
Self		0	0	0	0	0	0	0
Traditional Structures	1	2	2	3	1	2	4	0
Youth		0	0	0	0	0	0	0
Totals	**2**	**11**	**2**	**5**	**8**	**2**	**8**	**0**

Appendix K.1: Belief Progression Macro-Group Data – PRAGATI Villages, India

PRAGATI Subset	**Immediate**	**Progressive**
OM Sunaladana	0	0
YM Sunaladana	0	0
YW Sunaladana	0	0
OW Sunaladana	0	0
YM Palem	0	0
YW Palem	0	0
OM Palem	0	6
OW Palem	0	0
OW Agraharam	0	0
YM Agraharam	0	0
YW Agraharam	0	0
OM Agraharam	0	0
OW Itikalakota	0	0
YM Itikalakota	0	0
OM Itikalakota	0	0
YW Itikalakota	0	0
Subset Totals	**0**	**6**
Gendered Cohorts		
OM	0	6
OW	0	0
YM	0	0
YW	0	0

Appendix K.2: Project Perception Macro-Group Data – PRAGATI Villages, India

PRAGATI Subset	Mixed - 1	Negative 1	Neutral - 1	Positive 1
OM Sunaladana	0	0	0	2
YM Sunaladana	0	0	0	1
YW Sunaladana	0	0	0	1
OW Sunaladana	0	0	0	4
YM Palem	0	0	0	0
YW Palem	0	0	0	0
OM Palem	0	0	0	4
OW Palem	0	0	0	1
OW Agraharam	0	0	0	0
YM Agraharam	0	0	0	0
YW Agraharam	0	0	0	0
OM Agraharam	0	0	0	0
YW Itikalakota	0	0	0	0
OW Itikalakota	0	0	0	1
YM Itikalakota	0	0	0	1
OM Itikalakota	0	0	0	3
Subset Totals	**0**	**0**	**0**	**18**
Gendered Cohorts				
OM				9
YM				2
OW				6
YW				1

Appendix K.3: Personal Inclusion & Influence Macro-Group Data – PRAGATI Villages, India

PRAGATI Subset	Mixed - 2	Negative 2	Neutral - 2	Positive 2	Youth Consultation
OM Sunaladana	0	0	0	1	0
YM Sunaladana	0	0	0	0	0
YW Sunaladana	0	0	0	1	0
OW Sunaladana	0	0	0	2	0
YW Palem	0	0	0	4	0
YM Palem	0	0	0	3	0
OM Palem	0	0	0	6	0
OW Palem	0	0	0	8	0
OW Agraharam	0	0	0	0	0
YM Agraharam	0	0	0	1	0
YW Agraharam	0	0	0	0	0
OM Agraharam	0	0	0	0	0
YW Itikalakota	0	0	0	1	0
OW Itikalakota	0	0	0	1	0
YM Itikalakota	0	0	0	1	1
OM Itikalakota	0	0	0	1	0
Subset Totals	**0**	**0**	**0**	**30**	**1**
Gendered Cohorts					
OM				8	
YM				5	1
YW				6	
OW				11	

Appendix K.4: Climate Knowledge Macro-Group Data – PRAGATI Villages, India

PRAGATI Subset	A Posteriori	Experiential	Knowledge Gap
OM Sunaladana	1	2	0
YM Sunaladana	1	0	0
OW Sunaladana	3	0	3
YW Sunaladana	2	0	2
YW Palem	0	1	0
YM Palem	6	0	0
OM Palem	1	3	0
OW Palem	1	2	2
OW Agraharam	0	0	0
YM Agraharam	0	0	0
YW Agraharam	1	0	3
OM Agraharam	2	0	0
YW Itikalakota	1	2	0
OW Itikalakota	2	0	0
YM Itikalakota	2	0	1
OM Itikalakota	0	1	0
Subset Totals	**23**	**11**	**11**
Gendered Cohorts			
YM	8	1	1
OM	4	6	0
YW	5	3	5
OW	6	2	5

Appendix K.5: Climate Change Knowledge Acquisition Macro-Group Data – PRAGATI Villages, India

PRAGATI Subset	Before project	Extreme Event	Friends/Peers	News	Observation	Project Intervention	School
OM Sunaladana	0	0	0	0	0	0	0
YM Sunaladana	0	0	1	2	0	0	0
OW Sunaladana	0	0	0	2	0	0	0
YW Sunaladana	0	0	0	4	0	0	0
YW Agraharam	0	0	0	0	0	0	0
OM Agraharam	0	1	0	0	0	2	0
YM Agraharam	0	1	2	0	0	1	3
OW Agraharam	0	0	0	0	0	0	0
YM Palem	0	0	0	0	0	1	0
YW Palem	0	0	1	1	0	0	1
OM Palem	0	0	0	4	6	0	0
OW Palem	0	0	1	0	0	0	0
YW Itikalakota	0	1	0	1	0	0	0
OW Itikalakota	1	0	0	0	4	0	0
YM Itikalakota	0	0	0	5	3	0	0
OM Itikalakota	0	0	1	3	3	0	0
Subset Totals	**1**	**3**	**6**	**22**	**16**	**4**	**4**
Gendered Cohorts							
OM	0	1	1	7	9	2	0
OW	1	0	1	2	4	0	0
YM	0	1	3	7	3	2	3
YW	0	1	1	6	0	0	1

Appendix K.6: Signs and Indicators Macro-Group Data – PRAGATI Villages, India

PRAGATI Subset	Crop Yield/Soil Health	Health	Pollution	Socio-Cultural Change	Soil Erosion	Weather	Signs/ Indicators
OM Sunaladana	5	1	0	0	0	2	6
YM Sunaladana	3	0	0	0	0	1	4
YW Sunaladana	3	0	0	0	0	2	5
OW Sunaladana	0	2	0	0	0	1	3
YW Agraharam	2	0	0	0	0	4	7
OM Agraharam	3	0	0	0	0	2	3
OW Agraharam	4	0	0	0	0	0	4
YM Agraharam	2	0	0	0	0	1	4
YM Palem	15	1	0	1	0	9	18
YW Palem	0	1	0	0	0	1	2
OM Palem	4	0	0	0	0	2	6
OW Palem	6	0	0	0	0	5	9
YW Itikalakota	2	0	0	0	0	4	4
OW Itikalakota	2	0	0	0	0	2	6
YM Itikalakota	2	0	0	0	0	1	2
OM Itikalakota	4	1	0	0	0	3	7
Subset Totals	**57**	**6**	**0**	**1**	**0**	**40**	**90**
Gendered Cohorts							
OM	16	2				9	27
YM	22	1		1		12	36
YW	7	1				11	19
OW	12	2				8	22

Appendix K.7: Climate Action Macro-Group Data – PRAGATI Villages, India

PRAGATI Subset	Crop Diversification	Inaction	Irrigation	Land Development	Multi-Cropping & Seed Dispersal	Planting Trees/ Afforestation	Soil Enhancement
OM Sunaladana	0	2	0	1	1	1	0
YM Sunaladana	0	1	0	1	1	0	0
YW Sunaladana	0	6	0	3	0	0	0
OW Sunaladana	0	2	0	1	1	0	0
YW Palem	0	1	0	1	1	1	2
OM Palem	0	1	0	3	1	1	3
YM Palem	0	4	0	2	0	3	2
OW Palem	0	5	1	0	4	0	4
OM Agraharam	0	1	0	0	1	0	0
YW Agraharam	0	3	0	0	4	0	0
OW Agraharam	1	1	0	0	1	0	1
YM Agraharam	0	1	0	0	3	0	0
YW Itikalakota	0	2	0	1	0	0	1
OW Itikalakota	0	1	0	1	0	0	1
YM Itikalakota	0	1	0	1	0	0	0
OM Itikalakota	0	5	0	1	0	0	0
Subset Totals	**1**	**37**	**1**	**16**	**18**	**6**	**14**
Gendered Cohorts							
YM				**4**	**4**	**3**	**2**
OM				5	3	2	3
OW	1		1	2	6		6
YW				5	5	1	3

Appendix K.8: Cause and Proximity Macro-Group Data – PRAGATI Villages, India

PRAGATI Subset	Humans	International	Local	National	Nature
OM Sunaladana	1	0	0	0	0
YM Sunaladana	0	0	0	0	0
YW Sunaladana	0	0	0	0	0
OW Sunaladana	0	0	0	0	0
YM Palem	4	0	3	0	0
YW Palem	0	0	0	0	0
OM Palem	0	0	0	0	0
OW Palem	0	0	0	0	0
YW Agraharam	0	0	0	0	0
OM Agraharam	0	0	0	0	0
OW Agraharam	0	0	0	0	0
YM Agraharam	0	0	0	0	0
YW Itikalakota	2	0	0	2	1
OW Itikalakota	0	0	0	0	0
YM Itikalakota	1	0	0	0	0
OM Itikalakota	1	1	1	1	0
Subset Totals	**9**	**1**	**4**	**3**	**1**
Gendered Cohorts					
OM	2	1	1	1	
YM	5	0	3		
OW	0				
YW	2			2	1

Appendix K.9: Climate Risk Macro-Group Data – PRAGATI Villages, India

PRAGATI Subset	Children - 2	Coastal/Riverside Dwellers	Equal Risk	Farmer - 2	Hillside Dwellers
OM Sunaladana	0	0	1	0	0
YM Sunaladana	0	0	1	0	0
OW Sunaladana	1	0	1	0	0
YW Sunaladana	0	0	1	0	0
YW Agraharam	0	0	1	0	0
OM Agraharam	0	0	1	0	0
OW Agraharam	0	0	0	0	1
YM Agraharam	0	1	0	0	0
YM Palem	0	0	0	0	0
OW Palem	0	0	5	0	0
OM Palem	0	0	1	3	0
YW Palem	0	0	3	0	0
YW Itikalakota	0	0	1	0	0
OW Itikalakota	0	0	1	0	0
YM Itikalakota	0	0	1	0	0
OM Itikalakota	0	0	1	0	0
Subset Totals	**1**	**1**	**19**	**3**	**1**
Gendered Cohorts					
OM	0	0	4	3	0
OW	1	0	7	0	1
YM	0	1	2	0	0
YW	0	0	6	0	0

Appendix K.10: Climate Change Agency Macro-Group Data – PRAGATI Villages, India

PRAGATI Subset	Fatalism	Mixed - Agency	Nature 2 - Agency	Optimism	Resource Gaps
OM Sunaladana	1	0	0	4	4
YM Sunaladana	3	0	3	3	3
YW Sunaladana	3	0	0	0	3
OW Sunaladana	2	3	0	0	4
YW Agraharam	1	0	0	3	2
OM Agraharam	2	0	0	1	2
OW Agraharam	1	0	0	0	2
YM Agraharam	6	1	6	0	7
YM Palem	1	2	0	3	5
YW Palem	4	0	0	0	6
OM Palem	3	0	0	0	1
OW Palem	0	0	0	0	4
YW Itikalakota	1	0	0	0	1
OW Itikalakota	2	0	0	0	1
YM Itikalakota	3	2	4	0	3
OM Itikalakota	0	1	0	0	2
Subset Total	**33**	**9**	**13**	**14**	**50**
Gendered Cohorts					
OM	6	1	0	5	9
OW	5	3	0	0	11
YM	13	5	13	6	18
YW	9	0	0	3	12

Appendix K.11: Motive for Action Macro-Group Data – PRAGATI Villages, India

PRAGATI Subset	Children	Community/Village	Self/Offsprings
OM Sunaladana	0	1	0
YM Sunaladana	0	0	0
YW Sunaladana	0	0	0
OW Sunaladana	0	1	0
YW Palem	0	0	0
YM Palem	0	0	0
OM Palem	0	0	0
OW Palem	0	0	0
OM Agraharam	0	0	0
YW Agraharam	0	4	0
OW Agraharam	0	0	0
YM Agraharam	1	0	0
YW Itikalakota	0	0	0
OW Itikalakota	0	0	0
YM Itikalakota	0	3	0
OM Itikalakota	0	0	0
Subset Totals	**1**	**9**	**0**
Gendered Cohorts			
OM	0	1	
OW	0	1	
YM	1	3	
YW	0	4	

Appendix K.12: Climate Change Leadership Macro-Group Data – PRAGATI Villages, India

PRAGATI Subset	Community/ Village	Elders	Exemplary Females	Exemplary Men	Exemplary Person	Youth
OM Sunaladana	1	0	0	0	0	0
YM Sunaladana	0	0	0	0	2	0
OW Sunaladana	1	0	1	0	2	0
YW Sunaladana	0	0	0	0	3	0
YW Agraharam	4	3	0	0	3	0
OM Agraharam	0	1	0	0	2	0
OW Agraharam	0	0	0	0	0	1
YM Agraharam	0	0	0	0	0	1
YM Palem	0	0	0	0	1	0
YW Palem	0	0	0	0	0	0
OM Palem	0	0	0	0	5	4
OW Palem	0	0	1	2	3	0
YW Itikalakota	0	0	0	0	1	0
OW Itikalakota	0	0	0	0	1	0
YM Itikalakota	3	0	0	0	0	2
OM Itikalakota	0	0	0	0	1	0
Subset Totals	**9**	**4**	**2**	**2**	**24**	**8**
Gendered Cohorts						
OM	1	1	0	0	8	4
OW	1	0	2	2	6	1
YM	3	0	0	0	3	3
YW	4	3	0	0	7	0

Appendix L.1: Belief Progression Macro-Group Data – LayaVillages, India

Laya Subset	**Immediate**	**Progressive**
YM Pulusumamidi	0	0
YW Pulusumamidi	0	0
OW Pulusumadi	0	0
OM Pulusumadi	0	1
YM Nallikota	0	0
OM Nellikota	0	0
OW Nallikota	0	0
OM Munagalapudu	0	0
OW Munagalapudu	0	0
YW Munagalapudu	0	0
YM Munagalapudu	0	0
Subset Totals	**0**	**1**
Gendered Cohorts		
OM	0	1
OW	0	0
YM	0	0
YW	0	0
		0

Appendix L.2: Project Perception Macro-Group Data – Laya Villages, India

Laya Subset	Mixed - 1	Negative 1	Neutral - 1	Positive 1
YM Pulusumamidi	0	0	0	2
YW Pulusumamidi	0	0	0	3
OW Pulusumadi	0	0	0	4
OM Pulusumadi	0	0	0	5
YM Nallikota	0	0	0	1
OM Nellikota	0	0	0	0
OW Nallikota	0	0	0	0
OM Munagalapudu	0	0	0	4
OW Munagalapudu	0	0	0	1
YW Munagalapudu	0	0	0	5
YM Munagalapudu	0	0	0	1
Subset Totals	**0**	**0**	**0**	**26**
Gendered Cohorts				
OM				9
YM				4
OW				5
YW				8

Appendix L.3: Personal Inclusion & Influence Macro-Group Data – Laya Villages, India

Laya Subset	**Mixed - 2**	**Negative 2**	**Neutral - 2**	**Positive 2**	**Youth Consultation**
YM Pulusumamidi	0	0	0	3	5
YW Pulusumamidi	0	0	0	3	0
OW Pulusumadi	3	0	0	0	0
OM Pulusumadi	1	0	0	6	0
YM Nallikota	0	0	0	1	1
OM Nellikota	0	0	0	1	0
OW Nallikota	0	0	0	1	0
OM Munagalapudu	0	0	0	2	0
OW Munagalapudu	0	0	0	2	0
YW Munagalapudu	0	0	0	2	0
YM Munagalapudu	0	0	0	0	1
Subset Totals	**4**	**0**	**0**	**21**	**7**
Gendered Cohorts					
OM	1			9	
YM				4	7
YW				5	
OW	3			3	

Appendix L.4: Climate Knowledge Macro-Group Data – Laya Villages, India

Laya Subset	**A Posteriori**	**Experiential**	**Knowledge Gap**
YM Pulusumamidi	1	0	0
YW Pulusumamidi	0	0	3
OW Pulusumadi	0	1	1
OM Pulusumadi	5	1	2
YM Nallikota	5	1	1
OM Nellikota	0	1	2
OW Nallikota	2	0	1
OM Munagalapudu	2	2	0
OW Munagalapudu	0	0	2
YW Munagalapudu	1	0	1
YM Munagalapudu	0	0	1
Subset Totals	**16**	**6**	**14**
Gendered Cohorts			
YM	6	1	2
OM	7	4	4
YW	1	0	4
OW	2	1	4

Appendix L.5: Climate Change Knowledge Acquisition Macro-Group Data – Laya Villages, India

Laya Subset	Friends/Peers	News	Observation	Project Intervention	School
YM Pulusumamidi	0	0	0	0	3
YW Pulusumamidi	1	0	0	0	0
OW Pulusumadi	0	0	0	0	0
OM Pulusumadi	0	0	1	4	0
OW Nallikota	0	0	0	0	0
YM Nallikota	0	0	0	0	0
OM Nellikota	0	0	2	0	0
OM Munagalapudu	0	1	0	0	0
OW Munagalapudu	0	0	0	2	0
YW Munagalapudu	0	0	0	0	0
YM Munagalapudu	1	2	1	0	0
Subset Totals	**2**	**3**	**4**	**6**	**3**
Gendered Cohorts					
OM	0	1	3	4	0
OW	0	0	0	2	0
YM	1	2	1	0	3
YW	1	0	0	0	0

Appendix L.6: Signs and Indicators Macro-Group Data – Laya Villages, India

Laya Subset	Crop Yield/Soil Health	Health	Pollution	Socio-Cultural Change	Soil Erosion	Weather	Signs/ Indicators
YM Pulusumamidi	0	2	0	0	1	4	7
YW Pulusumamidi	3	0	0	0	0	3	6
OW Pulusumadi	4	0	0	0	0	3	6
OM Pulusumadi	4	0	1	0	0	3	7
OW Nallikota	4	0	0	0	0	0	4
YM Nallikota	1	0	1	0	0	4	6
OM Nellikota	3	4	0	0	0	1	7
OM Munagalapudu	4	0	0	1	0	1	6
OW Munagalapudu	2	0	0	0	0	0	2
YW Munagalapudu	2	0	0	0	0	3	4
YM Munagalapudu	2	0	0	0	0	1	3
Subset Totals	**29**	**6**	**2**	**1**	**1**	**23**	**58**
Gendered Cohorts							
OM	11	4	1	1		5	22
YM	3	2	1		1	9	16
YW	5	0				6	11
OW	10	0				3	13

Appendix L.7: Climate Action Macro-Group Data – Laya Villages, India

Laya Subset	Crop Diversification	Filters & Water Supply	Hydropower	Inaction	Multi-Cropping & Seed Dispersal	Planting Trees/ Afforestation	Soil Enhancement
YM Pulusumamidi	0	0	0	4	1	1	4
YW Pulusumamidi	0	0	0	10	4	0	1
OW Pulusumadi	0	0	0	10	4	0	0
OM Pulusumadi	0	0	0	2	9	2	2
OW Nallikota	0	1	0	2	1	0	0
YM Nallikota	0	0	0	0	6	0	0
OM Nellikota	1	1	0	0	3	0	1
OM Munagalapudu	0	3	3	8	5	0	3
OW Munagalapudu	0	0	1	1	3	0	0
YW Munagalapudu	0	4	1	3	1	0	0
YM Munagalapudu	0	0	0	1	2	0	0
Subset Totals	**1**	**9**	**5**	**41**	**39**	**3**	**11**
Gendered Cohorts							
OM	1	4	3	10	17	2	6
OW		1	1	13	8	0	0
YM		0	0	5	9	1	4
YW		4	1	13	5	0	1

Appendix L.8: Cause and Proximity Macro-Group Data – Laya Villages, India

Laya Subset	**Humans**	**International**	**Local**	**National**
YM Pulusumamidi	0	0	0	0
YW Pulusumamidi	0	0	0	0
OW Pulusumadi	0	0	0	0
OM Pulusumadi	0	0	0	0
OW Nallikota	0	0	0	0
YM Nallikota	0	0	0	0
OM Nellikota	0	0	0	0
OM Munagalapudu	0	0	0	0
OW Munagalapudu	0	0	0	0
YW Munagalapudu	0	0	0	0
YM Munagalapudu	1	1	1	1
Subset Totals	**1**	**1**	**1**	**1**
Gendered Cohorts				
OM	0	0	0	0
OW	0	0	0	0
YM	1	1	1	1
YW	0	0	0	0

Appendix L.9: Climate Risk Macro-Group Data – Laya Villages, India

Laya Subset	Equal Risk	Farmer - 2	Hillside Dwellers	Me
YM Pulusumamidi	2	0	0	0
YW Pulusumamidi	1	0	0	0
OW Pulusumadi	1	0	1	1
OM Pulusumadi	1	3	0	0
OW Nallikota	0	0	0	0
YM Nallikota	2	0	0	0
OM Nellikota	1	0	0	0
OM Munagalapudu	0	0	0	0
OW Munagalapudu	0	0	0	0
YW Munagalapudu	0	0	0	0
YM Munagalapudu	0	0	0	0
Subset Totals	**8**	**3**	**1**	**1**
Gendered Cohorts				
OM	2	3	0	0
OW	1	0	1	1
YM	4	0	0	0
YW	1	0	0	0

Appendix L.10: Climate Change Agency Macro-Group Data – Laya Villages, India

Laya Subset	Fatalism	Mixed - Agency	Nature 2 - Agency	Optimism	Resource Gaps
YM Pulusumamidi	2	0	0	0	1
YW Pulusumamidi		4	0		0
OW Pulusumadi	2	0	0	4	6
OM Pulusumadi	0	1	1	3	4
OW Nallikota	0	0	0	0	1
YM Nallikota	1	0	1	1	1
OM Nellikota	1	0	0	3	1
OM Munagalapudu	3	2	1	1	5
OW Munagalapudu	0	2	0	0	1
YW Munagalapudu	1	0	1	0	1
YM Munagalapudu	0	0	0	1	1
Laya Subset	**14**	**5**	**4**	**13**	**26**
Gendered Cohorts					
OM	4	3	2	7	10
OW	2	2	0	4	8
YM	2	0	0	1	2

Appendix L.11: Motive for Action Macro-Group Data – Laya Villages, India

Laya Subset	Children	Community/Village	Self/Offsprings
YM Pulusumamidi	0	0	0
YW Pulusumamidi	0	0	0
OW Pulusumadi	0	1	0
OM Pulusumadi	0	1	0
YM Nallikota	0	0	0
OM Nellikota	0	0	0
OW Nallikota	0	2	0
OM Munagalapudu	0	0	0
OW Munagalapudu	0	0	0
YW Munagalapudu	0	0	0
YM Munagalapudu	0	1	1
Subset Totals	**0**	**5**	**1**
Gendered Cohorts			
OM		1	
OW		3	
YM		1	1
YW		0	

Appendix L.12: Climate Change Leadership Macro-Group Data – Laya Villages, India

Laya Subset	Community/Village	Exemplary Person	External	Youth
YM Pulusumamidi	0	0	0	3
YW Pulusumamidi	0	0	5	0
OW Pulusumadi	1	0	4	0
OM Pulusumadi	1	0	7	0
OW Nallikota	2	0	1	0
YM Nallikota	0	0	0	1
OM Nellikota	0	1	0	0
OM Munagalapudu	0	0	4	0
OW Munagalapudu	0	2	0	0
YW Munagalapudu	0	0	0	2
YM Munagalapudu	1	0	0	1
Subset Totals	**5**	**3**	**21**	**7**
Gendered Cohorts				
OM	1	1	11	0
OW	3	2	5	0
YM	1	0	0	5
YW	0	0	5	2

Appendix M.1: Project Perception Macro-Group Data – Belizean Villages

Ya'axché Subset	Mixed - 1	Positive 1
OW Indian Creek	0	4
YM Indian Creek	0	5
YW Indian Creek	3	3
OM Indian Creek	1	4
OM San Miguel	0	3
POW San Miguel	0	0
OM Trio	0	5
YW Trio	0	3
OW Trio	0	2
OM Trio - Cocoa Group (Specialist)	1	5
YM Trio	0	4
Subset Total	**1**	**19**
Gendered Cohorts		
OM	**2**	**17**
OW		**6**
YM		**9**
YW	**3**	**6**
Flowers Bank Subset and Gendered Cohorts		
Flowers Bank - OM FG	0	6
Flowers Bank - OW FG	0	8
Flowers Bank - YM FG	0	0
Flowers Bank - YW FG	0	3
Subset Totals	**0**	**17**
Case Level Totals	**5**	**55**
Gendered Cohorts - Case Level		
OM	**2**	**23**
OW		**14**
YM		**9**
YW	3	9

Appendix M.2: Personal Inclusion and Influence Macro-Group Data – Belizean Villages

Ya'axché Subset	**Mixed - 2**	**Positive 2**	**Youth Consultation**
OW Indian Creek	0	0	0
YM Indian Creek	0	5	0
YW Indian Creek-	0	6	0
OM Indian Creek	2	1	0
San Miguel OM-FG	0	2	0
San Miguel - OW FG	0	0	0
Trio - OM FG	0	4	0
Trio - YW FG	0	3	0
Trio - OW FG	0	3	0
Trio - Cocoa Group FG (Specialist)	1	5	0
Trio - YM FG	2	1	0
Subset Totals	**3**	**16**	**0**
Gender Cohorts			
OM	**3**	**12**	**0**
OW		**3**	**0**
YM	**2**	**6**	**0**
YW		**9**	**0**
Flowers Bank Subset and Gendered Cohortts			
Flowers Bank - OM FG	0	1	0
Flowers Bank - OW FG	0	2	0
Flowers Bank - YM FG	0	0	0
Flowers Bank - YW FG	1	1	1
Subset Totals	**1**	**4**	**1**
Case Level Totals	**6**	**34**	**1**
Gender Cohorts - Case Level			
OM	**3**	**13**	
OW		**5**	
YM	**2**	**6**	
YW	1	10	1

Appendix M.3: Climate Change Knowledge Macro-Group Data – Belizean Villages

Ya'axché Subset	A Posteriori	Experiential	Knowledge Gap
OW Indian Creek	0	1	6
YM Indian Creek	2	0	7
YW Indian Creek	6	0	4
OM Indian Creek	1	3	2
OM San Miguel	2	0	6
OW San Miguel	0	0	9
OM Trio	7	0	1
YW Trio	3	0	7
OW Trio	2	0	0
OM Trio - Cocoa Group (Specialist)	6	3	1
YM Trio	5	0	0
Subset Totals	**34**	**7**	**43**
Flowers Bank Subset and Gendered Cohorts			
Flowers Bank - OM FG	1	0	0
Flowers Bank - OW FG	3	0	1
Flowers Bank - YM FG	2	0	2
Flowers Bank - YW FG	4	0	1
Subset Totals	**10**	**0**	**4**
Case Totals	**44**	**7**	**47**
Gendered Cohorts - Case Level			
OM	**17**	**6**	**10**
OW	**5**	**1**	**16**
YM	**9**		**9**
YW	**13**		**12**

Appendix M.4: Climate Change Knowledge Acquisition Macro-Group Data – Belizean Villages

Ya'axché Subset	Catholic Church	Extreme Event	Friends/ Peers/ Relatives	News	Observation	Project Intervention	School	Village Meeting
OW Indian Creek	0	0	0	0	0	0	0	0
YM Indian Creek	0	0	0	0	0	0	5	0
YW Indian Creek	0	0	0	0	0	0	6	0
OM Indian Creek	0	0	0	0	3	5	0	0
OM San Miguel	0	0	2	1	1	0	0	0
OW San Miguel	0	0	0	0	0	0	0	0
OM Trio	1	0	1	0	0	0	0	1
YW Trio	0	0	0	0	0	0	1	0
OW Trio	0	0	0	0	2	0	0	0
OM Trio - Cocoa Group (Specialist)	0	0	0	1	0	4	0	0
YM Trio	0	0	0	1	0	0	4	0
Subset Total	**1**	**0**	**3**	**3**	**6**	**9**	**16**	**1**
Flowers Bank Subset and Gendered Cohorts								
OM Flowers Bank	0	0	1	3	0	0	1	0
OW Flowers Bank	0	1	3	4	0	0	0	0
YM Flowers Bank	0	0	1	1	0	0	2	0
YW Flowers Bank	0	0	0	2	0	0	1	0
Subset Total		**1**	**5**	**10**			**4**	
Case Totals	**1**	**1**	**8**	**13**	**6**	**9**	**20**	**1**
Gendered Cohorts - Case Level								
YM			1	2			11	
YW				2			8	
OM	1		4	5	4	9	1	1
OW		1	3	4	2		0	

Appendix M.5: Signs and Indicators Macro-Group Data – Belizean Villages

Ya'axché Subset	Weaher	Crop Yield/Soil Health	Fish Stock	Forest Fires	Health	Pollution	Soil Erosion
OW Indian Creek	2	2	0	0	0	0	0
YM Indian Creek	7	0	0	0	0	1	0
YW Indian Creek	2	1	0	0	0	4	0
OM Indian Creek	6	3	0	0	0	0	0
OM San Miguel	4	1	0	0	0	0	0
OW San Miguel	0	0	0	0	3	0	0
OM Trio	4	3	3	1	4	6	0
YW Trio	3	1	0	0	1	0	0
OW Trio	4	5	0	0	0	0	0
OM Trio - Cocoa Group (Specialist)	4	2	1	0	3	4	0
YM Trio	3	4	0	0	0	0	0
Subset Totals	**39**	**22**	**4**	**1**	**11**	**15**	**0**
Gendered Cohorts							
YM	10	4				1	
YW	5	2			1	4	
OM	18	9	4	1	7	10	
OW	6	7			3		
Flowers Bank Subset and Gendered Cohorts							
OM Flowers Bank	6	3	0	0	0	0	0
OW Flowers Bank	4	1	0	0	1	0	1
YM Flowers Bank	3	0	0	0	0	0	0
YW Flowers Bank	2	2	0	0	0	2	2
Subset Totals	15	**6**	**0**		**1**	**2**	**3**
Case Totals	**56**	**28**	**4**	**1**	**12**	**17**	**3**
Gendered Cohorts - Case Level							
YM	13	4				1	
YW	7	4			1	6	2
OM	24	12	4	1	7	10	
OW	10	8			4		1

Appendix M.6: Climate Action Macro-Group Data – Belizean Villages

Ya'axché Subset	Agroforestry	Bee-keeping	Bird Conservation /Tracking	Inaction	Multi-Cropping & Seed Dispersal	Planting Trees/ Afforestation	River Buffer	School/ General Clean Up	Taboo/ No Take
OW Indian Creek	2	1	0	4	0	0	0	0	0
YM Indian Creek	3	0	2	4	0	3	0	2	0
YW Indian Creek	0	0	0	6	0	0	0	0	0
OM Indian Creek	4	3	0	0	0	0	0	0	0
OM San Miguel	2	0	0	0	2	0	1	0	1
OW San Miguel	0	0	0	3	0	0	0	0	0
OM Trio	5	0	0	3	0	0	0	0	0
YW Trio	1	3	0	3	0	0	0	0	0
OW Trio	3	1	0	3	0	0	0	0	0
OM Trio - Cocoa Group (Specialist)	5	0	0	0	0	0	0	0	0
YM Trio	3	0	0	4	0	0	0	0	0
Subset Total	19	4	0	16	2	0	1	0	1
Gendered Cohorts									
YM	6	1	2	8		3		2	
YW	3	3		9					
OM	6	3		3	2		1		1
OW	5	2		10					
Flowers Bank Subset and Gendered Cohors									
OM Flowers Bank	0	0	0	5	0	0	0	0	0
OW Flowers Bank	0	0	0	12	0	0	0	0	0
YM Flowers Bank	0	0	0	7	0	0	0	0	0
YW Flowers Bank	0	0	0	6	0	0	0	0	0
Subset Total	**0**	**0**	**0**	**30**	**0**	**0**	**0**	**0**	**0**
Case Totals	**28**	**8**	**2**	**60**	**2**	**3**	**1**	**2**	**1**
Gendered Cohorts - Case Level									
YM	6	1	2	15		3		2	
YW	3	3		15					
OM	6	3		8	2		1		1
OW	5	2		22					

Appendix M.7: Cause and Proximity Macro-Group Data – Belizean Villages

Ya'axché Subset	God/Religion	Humans	International	Local	National	Nature
OW Indian Creek	0	0	0	0	0	0
YM Indian Creek	0	3	2	1	2	2
YW Indian Creek	0	0	0	0	0	0
OM Indian Creek	0	0	0	0	0	0
OM San Miguel	0	0	0	0	0	0
OW San Miguel	0	0	0	0	0	2
OM Trio	1	15	0	16	0	0
YW Trio	1	1	0	1	0	0
OW Trio	0	0	0	0	0	0
OM Trio - Cocoa Group (Specialist)	0	10	1	9	0	0
YM Trio	0	3	1	3	1	0
Subset Total	**2**	**29**	**2**	**29**	**1**	**0**
Gendered Cohorts						
OM	1	25	1	25		
YM		6	3	4	3	2
YW		1		1		
OW	1	0		0		2
Flowers Bank Subset and Gendered Cohorts						
OM Flowers Bank	0	2	0	2	0	1
OW Flowers Bank	4	2	0	2	0	1
YM Flowers Bank	1	0	0	0	0	3
YW Flowers Bank	0	2	0	2	0	0
Subset Total	**5**	**6**	**0**	**6**	**0**	**5**
Gendered Cohorts - Case Level						
OM	1	27	1	27		1
YM	1	6	3	4	3	5
YW	0	3		3		0
OW	5	2		2		3
Case Level Totals	**7**	**38**	**4**	**36**	**3**	**9**

Appendix M.8: Climate Risk Macro-Group Data – Belizean Villages

Ya'axché Subset	Coastal/Riverside Dwellers	Elderly	Equal Risk	Farmer - 2	Me
OW Indian Creek	0	0	3	1	0
YM Indian Creek	0	2	2	0	0
YW Indian Creek	0	0	0	1	0
OM Indian Creek	0	2	1	2	0
OM San Miguel	0	0	3	0	0
OW San Miguel	0	0	0	0	0
OM Trio	0	0	1	4	0
YW Trio	0	0	0	0	0
OW Trio	0	0	2	0	0
OM Trio - Cocoa Group (Specialist)	0	0	5	0	0
YM Trio	0	0	2	1	0
Subset Total	**0**	**4**	**19**	**9**	**0**
Gendered Cohorts					
YM		2	4	1	
YW			0	1	
OM		2	10	6	
OW			5	1	
Flowers Bank Subset and Gendered Cohorts					
Flowers Bank - OM FG	0	0	3	1	1
Flowers Bank - OW FG	0	0	6	0	0
Flowers Bank - YM FG	1	0	1	1	0
Flowers Bank - YW FG	1	0	3	0	0
Subset Total	**2**	**0**	**13**	**2**	**1**
Gendered Cohorts - Case Level					
YM	1	2	5	2	
YW	1		3	1	1
OM		2	13	7	
OW			11	1	
Case Totals	**2**	**4**	**32**	**11**	**1**

Appendix M.9: Climate Change Agency Macro-Group Data – Belizean Villages

Ya'axché Subset	Failed Actions	Fatalism	Mixed - Agency	Nature 2 - Agency	None	Optimism	Religious	Resource Gaps
OW Indian Creek	0	1	1	0	1	3	1	7
YM Indian Creek	0	2	0	1	0	2	0	0
YW Indian Creek	0	0	0	0	0	10	0	6
OM Indian Creek	0	0	5	0	0	0	0	5
OM San Miguel	0	0	3	0	0	2	0	1
OW San Miguel	0	2	5	3	0	0	0	0
OM Trio	0	0	0	0	0	8	0	0
YW Trio	0	2	0	0	0	0	2	3
OW Trio	0	0	7	0	0	0	0	7
OM Trio - Cocoa Group (Specialist)	0	0	0	0	0	5	0	0
YM Trio	0	1	1	0	0	1	0	4
Subset Total	**0**	**8**	**22**	**4**	**1**	**31**	**3**	**33**
Gendered Cohorts								
YM	0	3	1	1	0	3		4
YW	0	2	0	0	0	15	2	9
OM	0	0	8	0	0	10		6
OW	0	3	13	3	1	3	1	14
Flowers Bank Subset and Gendered Cohorts								
OM Flowers Bank	1	2	1	0	0	2	0	6
OW Flowers Bank	0	3	2	1	0	1	4	8
YM Flowers Bank	0	4	0	3	0	0	1	4
YW Flowers Bank	0	1	1	0	0	2	0	6
Subset Total	**1**	**10**	**4**	**4**	**0**	**5**	**5**	**24**
Case Totals	**1**	**18**	**26**	**8**	**1**	**36**	**8**	**57**
Gendered Cohorts - Case Level								
YM		7	1	4	0	3	1	8
YW		3	1	0	0	17	2	15
OM	1	2	9	0	0	12	0	12
OW		6	15	4	1	4	5	22

Appendix M.10: Motive for Action Macro-Group Data – Belizean Villages

Ya'axché Subset	Children	Community/ Village	God/Religion	Self/Offsprings	World
OW Indian Creek	1	0	0	0	0
YM Indian Creek	0	1	0	0	0
YW Indian CreeK	0	1	0	0	0
OM Indian Creek	0	0	0	0	0
OM San Miguel	0	0	0	0	0
OW San Miguel	0	0	0	0	0
OM Trio	0	0	1	0	0
YW Trio	0	0	1	0	0
OW Trio	1	0	0	1	0
OM Trio - Cocoa Group (Specialist)	0	8	0	3	0
YM Trio	0	0	0	0	0
Subset Totals	**1**	**8**	**2**	**4**	**0**
Gendered Cohorts					
YM		**1**	**0**	**0**	**0**
YW		**1**	**1**	**0**	**0**
OW	**2**	**0**	**0**	**1**	**0**
OM		**8**	**1**	**3**	**0**
Flowers Bank Subset and Gendered Cohorts					
OM Flowers Bank	0	3	0	2	2
OW Flowers Bank	0	1	4	0	0
YM Flowers Bank	0	1	1	0	0
YW Flowers Bank	0	2	0	1	2
Subset Totals	**0**	**7**	**5**	**3**	**4**
Case Level Totals	**2**	**17**	**7**	**7**	**4**
Gendered Cohorts - Case Level					
YM		2	1	0	2
YW		3	1	1	
OW	2	1	4	1	
OM		11	1	5	2

Appendix M.11: Climate Change Leadership Macro-Group Data – Belizean Villages

Ya'axché Subset	Community/ Village	Elders	Exemplary Group	Exemplary Person	External	Teachers	Traditional Structures	Youth
OW Indian Creek	0	3	0	0	0	0	0	0
YM Indian Creek	1	0	0	0	3	0	3	0
YW Indian Creek	1	4	0	0	0	0	6	0
OM Indian Creek	0	0	0	0	5	0	0	0
OM San Miguel	0	0	0	0	3	0	0	0
OW San Miguel	0	0	0	4	0	0	0	0
OM Trio	0	0	0	0	5	0	0	0
YW Trio	0	0	0	0	0	0	1	0
OW Trio	0	0	0	0	2	0	0	0
OM Trio - Cocoa Group (Specialist)	8	0	2	0	0	0	0	0
YM Trio	0	0	0	0	0	0	3	0
Subset Total	**10**	**7**	**2**	**4**	**18**	**0**	**13**	**0**
Gendered Cohorts								
YM	**1**				**3**	**0**	**6**	**0**
YW	**1**	**4**			**0**	**0**	**7**	**0**
OW	**0**	**3**		**4**	**2**	**0**	**0**	**0**
OM	**8**		**2**		**13**	**0**	**0**	**0**
Flowers Bank Subset and Gendered Cohort								
OM Flowers Bank	3	0	0	0	3	0	0	0
OW Flowers Bank	1	0	0	0	1	1	1	0
YM Flowers Bank	1	0	0	0	1	0	2	0
YW Flowers Bank	2	0	0	0	0	0	1	3
Subset Total	**7**	**0**	**0**	**0**	**5**	**1**	**4**	**3**
Case Totals	**17**	**7**	**2**	**4**	**23**	**1**	**17**	**3**
Gendered Cohorts - Case Level								
YM	2				4		8	
YW	3	4			0		8	3
OW	1	3		4	3	1	1	
OM	11		2		16		0	

Appendix N.1: Cycle of Agricultural, Horticultural and Forest Produces; Festivals – India (Laya, 2005, p. 43).

Sl no.	Item	Position over months Index: Sowing: ❑ , Harvesting (or collecting): ✸ , Marketing : ⌘ , Consumption: ❖ ,Month of occurrence : ⊠												Remark
	Agricultural produces	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	
	Food grain/Millets													
❖	*Budama*- dry land paddy						❑			✸	✸			up land/hilly land
❖ ⌘	*Vari dhanyam*- wetland paddy						❑	❑T	❑T			✸	✸	Very small percentage of families sell.
❖ ⌘	Maize*(mokkajonna)*					1st. week ❑	2nd week ❑		✸❖	✸❖				Mostly in backyard/ homestead.
		Families having more land grow it in agriculture field. Used as mixed crop at the backyard. People boil, dry and preserve for rainy season. There are different varieties- *Korajana* - one pod, big and tasty; *Rangiri Jonna*- 2-3 medium pods; *Sama jana*- 2/3 small pods. *Mokkajonna* takes both high as well as low rains. In case of heavy rain, grows fast and cobs are bigger. Three rains are sufficient. It is not grown in far away land because of problem of potential nuisance from wild animals, theft. Very small quantity of maize (raw) is sold –especially from the project villages												
❖	Sama (minor millet) Korra sama (small)					❑	❑		✸❖	✸❖				Varieties exist- Korrasama/ Peddasama, etc, Podu/dry/up land. Rice beer is made.
❖	Pedda sama (big)						❑					✸	✸	
❖	Adulu (minor millet)	✸					❑						✸	Grow wild in up lands- 1 bag/acr.
❖	Ragi (Chodi)					❑	❑	❑T	❑T		✸	✸	✸	Dry land
		Both short and long duration; some are broadcasted some transplanted. Long duration is tastier. Yield is higher in case of transplanting. It is still one of the staple food item – fast loosing ground to rice.												
❖	Korra (Foxtail millet)					❑	❑					✸	✸	Only in podu land (mixed crop)
❖	Bajra (ganti)					❑	❑					✸	✸	
❖	Jowar (Jana/Kakijana)					❑	❑				✸	✸	✸	Podu land / dry land. Mixed with Budama paddy/ chodi. Used for brewing liquor.
	Pulses/Beans													
❖	Horse gram (Ulubalu)								❑	❑		✸	✸	Dry land.
		Sometimes intercropped with Niger. One of the main source of cash income for large percentage of families.												
⌘	Rajama (Nella Chikudu)*					❑					✸	✸	✸	Upland.
		Tasty, commonly sought after item, fetches comparatively higher price. Mostly marketed, also used for treatment of special guests. There are few varieties like *Rangabati, Tandagutulu, Bastarlu* - volume of production and rates widely vary. Creeper variety-tree stumps, maize in the *podu* land used as support.												

Appendix N.2: Cycle of Agricultural, Horticultural and Forest Produces; Festivals – India (Laya, 2005, p. 44).

Sl no.	Item	Position over months Index: Sowing:❑ , Harvesting (or collecting):✹ , Marketing : ⌘ , Consumption: ❖ ,Month of occurrence : ⍓												Remark
	Agricultural produces	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	
⌘	Konda kandul (Redgram- *Kandi* #)					❑							✹	Podu, upland, mixed with paddy
❖	Timeri kandul #									❑			✹	As second crop-up land/podu
❖ ⌘	Siri kandul (small) #					❑							✹	
		Podu/ up lands and slope lands- sales @ Rs.15/Kg. Good harvest, better price in comparison to the 'Big Kandul'. Tolerates heavy rain as well as dry situation.												
❖ ⌘	Pedda kandul (big) #			✹	✹	❑								
		Podu/ up lands and slope lands . Volume of cultivation is gradually decreasing because of free cattle grazing- as it is harvested towards –Mach/April.. Raw beans are sold in small quantity in Market days .												
❖ ⌘	Black gram (Minimalu)	✹								❑			✹	Mixed with ragi in slope lands.
		Potential of cultivation in low lands as second crop or mono rain crops.												
⌘	Babbarlu (Longbeans)					❑						✹	✹	Podu land/fenced land
	Oilseeds													
❖ ⌘	Niger (Alusalu)	✹								❑			✹	
		One variety. Usually done in dry land/ podu. Very little in Podu- mostly in dry/ slope land. Done in alternative years.												
❖ ⌘	Sesamum (Nuvvulu)									❑			✹	
❖	Castor (Amadum)	✹	✹		❑	❑								
		Some natural/some sown in podu/backyards but not in large quantity- traditionally extracted oil is used as hair oil												
⌘	Sunflower (Podutirgudu)	✹								❑	❑			Was introduced by ITDA- now grown by few.
❖ ⌘	G. nut (Veru senagu)					❑	❑		✹	✹				Better harvest in slope/up land at lower level with small pebbles
	Spices													
⌘	Turmeric(Pasupu)		✹	✹	❑	❑								
		Dry land/ fenced land near to habitation, under tree shades. Some (include families not having enough open land)grow in hills/podu land. Usually harvested once in 2 years												
⌘	Ginger(Alum)					❑			✹				✹	
		Shady up land near to habitation. Ginger is also transplanted. Dung manure is applied and mulching - rice hay, mango, jackfruit leaves- is done. Tree shades - Tamarind, Jackfruit, Mango- is used. Trees with smaller leaves- relatively short duration dribbling after rain and light shade - is considered best.												
⌘	Pepper (Pippalimodi)	✹	✹	✹					❑ sucker planted	❑ sucker planted				
		Fenced open field near to habitation preferred. Needs manure. Harvested in 2 years. Mixed cropping with turmeric and *arvi*. Can gives sizeable income up to Rs.5,000, but the price fluctuates widely.												

Appendix N.3: Cycle of Agricultural, Horticultural and Forest Produces; Festivals – India (Laya, 2005, p. 45).

Sl no.	Item	Position over months Index: Sowing:❑ , Harvesting (or collecting):✽ , Marketing : ⌘ , Consumption: ❖ ,Month of occurrence : ⊠												Remark
	Agricultural produces	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	
	Others													
❖	Tapioca (Sago dumpa)	✽	✽					❑P						Dry land plain
❖ ⌘	Brinjal (Vankaya)						❑P	❑P		✽	✽	✽	✽	Dry land plain
❖ ⌘	Tomatoes								❑P		✽	✽	✽	Upland/Podu
⌘ ❖	Marigold (Banthi)								❑P		✽	✽	✽	Upland near to habitation.
	Marketing : ⌘ -mostly marketed; ❖: Consumption- mostly consumed; ⌘❖-both consumption and marketing are important													
	MAJOR HORTICULTURAL PRODUCES (HOMESTEADS AND SURROUNDINGS)													
❖ ⌘	Guava (Jama)			✽	✽				✽	✽				
		Most families have 1-3 in their homesteads- one tree can fetch up to Rs.300 (Paderu)												
❖, ⌘	Jackfruit		✽ Veg	✽ Veg	✽ Veg	✽ Veg	✽ Veg	✽ Ripe	✽ Ripe					
		About 06-70% families have one/two in their homesteads / surroundings. Tender jackfruit, ripe ones and seeds are sold.- families get about Rs.500 from tender jack fruit, Rs. 400 from ripe ones (Rs.5-10/each) and about Rs. 100 from seeds-Rs.2/kg. (Paderu) However, marketing is a problem and depends on the outside traders.												
❖, ⌘	Banana (Areti)	✽	✽	✽	✽	✽	✽	✽	✽	✽	✽	✽	✽	
		Only about 5% families in every village. Need to be fenced especially during summer, when cattle grazing is open. Standard bunch of curry-banana fetches Rs. 50 and ripe ones fetch Rs.100. Grown in Homesteads/*doddilu* and near by agriculture land.												
❖ ⌘	Mango (Mamidi) and Wild mango (Konda mamidi)				✽ Ripe	✽ Ripe	✽ Ripe							
		Almost every family has in homesteads and surroundings. Families get average about Rs.1,000 from fruit and jelly (some families make liquor from ripe ones). In some villages, families plant in commons- rights on them goes to the planters.												
❖ ⌘	Tamarind (Chinthapandu)			✽	✽	✽								
		Every village, except about 10 % families, others have about 5 trees /family. Families get about Rs.500 - Rs. 1,000 per tree. Mostly found in village surrounding, land near to homestead, foothills and ridges near to habitation (planting of new trees on the ridges was observed in Burdamamidi).												
❖	Jamun (Neredu)						✽	✽						
		Mainly in village commons in some villages. Seeds marketable. Liquor is prepared from fruit.												
❖ ⌘	Custard apple (Seethaphalam)								✽	✽	✽			
		About 5% families at random in some villages- mainly on fence and homesites-2/3 trees. Some families get about Rs.100 per tree @ Rs.1/ fruit.												
❖ ⌘	Lemon (Nimma)							✽	✽	✽				
		Only about 2/3% families-1/2 trees, About Rs.100/tree. There are varieties which yield round the year. Reportedly, both the demand and price are low in Paderu and Addateegala.												

Appendix N.4: Cycle of Agricultural, Horticultural and Forest Produces; Festivals – India (Laya, 2005, p. 46).

Sl no.	Item	Position over months Index: Sowing: ❑ , Harvesting (or collecting): ✱ , Marketing : ⌘ , Consumption: ❖ ,Month of occurrence : ⍓												Remark
	Agricultural produces	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
MAJOR HORTICULTURAL PRODUCES (HOMESTEADS AND SURROUNDINGS) Continues...														
❖ ⌘	Munuga	✱				✱	✱						✱	
		About 8% families in about 30% villages-about one tree/family. One tree can fetch Rs.300/400/. Average family spends Rs.30-50 every month to buy drumsticks for *Sambhar*. As gathered, the Munuga trees die prematurely, (Paderu region) and people do not prefer to have the tree near to house because of fear of Caterpillar.												
❖ ⌘	Coconut (Kobbari)				✱	✱	✱			✱	✱	✱		Very small percentages of families have in ones/twos.
⌘	Cashew (Jeedi mamidi)				✱	✱								Up/ degraded land.
❖ ⌘	Sour orange (Narinja)										✱	✱		
		Backyard. Very small percentages of families have just one. Sells well –people have experience of getting Rs.600/tree												
❖	Papaya	✱	✱	✱	✱	✱	✱	✱	✱	✱	✱	✱	✱	Only few families have
❖ ⌘	Palm (Jilugu) Toddy (Sap)	✱	✱	✱	✱	✱	✱	✱	✱	✱	✱	✱	✱	Backyard, Agriland. – mostly in Addateegala cluster
	FOREST PRODUCES													
⌘	Adda leaves	✱	✱	✱	✱	✱	✱			✱	✱	✱	✱	Rapidly decreasing.
⌘	Shikakai (soapnuts)				✱	✱								Decreasing
⌘	Nux vomica (musuri)									✱	✱			In forest, Andravara
⌘	Broom grass			✱	✱	✱								
		Used to be available in Andravara (Paderu)- not at present. Annampalem (Addateegala) 5 families make about 500 broom –sales@Rs.15/piece.												
⌘	Gumkaraya (Kovela)	✱	✱	✱	✱	✱						✱	✱	Rs.80/kg, 5 fam. in Annampalem collect 550kg.
⌘	Kanuga (Pongamia pinnata)										✱	✱		
❖ ⌘	Marking nut (Nalla jeedi)				✱	✱								
	Neem (Vepa)													Fruits not collected. Plentiful in Addateegala.
⌘	Beedi leaves (Tunika)				✱	✱								
❖	Wild Mango (Konda mamidi)				✱	✱	✱							
❖	Bamboo shoots							✱	✱	✱				
❖	Mandikura				✱	✱								Leaves collected
❖	Konkadikura							✱	✱					Leaves collected
❖	Godrunkura		✱	✱	✱									Leaves collected
❖	Tegadumpalu									✱	✱			Bulbs collected
❖	Pindidumpalu	✱	✱	✱	✱	✱	✱							Bulbs collected
❖	Sedadumpalu	✱								✱	✱	✱	✱	Bulbs collected
❖	Sarikura			✱	✱	✱	✱	✱	✱	✱				Leaves collected
❖	Kanchedi puvulu		✱	✱	✱									Flower collected

Appendix N.5: Cycle of Agricultural, Horticultural and Forest Produces; Festivals – India (Laya, 2005, p. 47).

Sl no.	Item	Position over months Index: Sowing: ❑ , Harvesting (or collecting): ✹ , Marketing : ⌘ , Consumption: ❖ ,Month of occurrence : 🖂 Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec	Remark
		MAJOR FESTIVALS	
1	Gangalamma	🖂 in May	
		One week. Hunting, drinking & cultural programme during night. Food-Rs.2,000, Dress Rs.2,000, Others 500=Total 4,500/family	
2	Sankranthi	🖂 in Jan	
		Food:Rs.1,000 , Dress: Rs. 2,500 , Others: Rs.500 =Total Rs.4,000	
	Rajulubabu Panduga	🖂 in Feb	Protect from dangerous situation: Rs.300 (food 200, other-100)
3	Kothaamavasya	🖂 in Mar	
		New ploughing starts. One chicken is sacrificed for the safety of agriculture tools. Total: Rs.200 (food Rs.150, Others Rs.50)	
4	Korrakotha	🖂 in Aug, 🖂 in Sept	Addateegala & Paderu
		Related to offering of new crop (Millet) before first consumption Rs.100-300 for food and drinks	
5	Budamakotha or Dussera	🖂 in Sept, 🖂 in Oct	
		Harvesting of Budama paddy- can eat new dry land paddy afterwards.Rs.100 for food.	
6	Palkam	🖂 in Nov, 🖂 in Dec	
		Related to forest produce collection-starts collection of Adda leaves; and eat seeds, Rs.50	
7	Baddi Panduga	🖂 in Oct	Protection of crop- Rs.100 for food
8	Papu Panduaga	🖂 in Jan	Eat new pulses. No special expenses involved
9	Vittanalu Panduga	🖂 in Apr (Paderu) related to seed sowing. Seeds of all crops are collected and placed in place of worship to get blessings- believe that it ensures better harvest. About Rs.50 towards food.	
10	Vitingi Panduga	🖂 in Apr	Food Rs.500, Dress-Rs 800,other Rs.200= Rs.1500/family
		(Paderu) Related to worshiping of agricultural implements, protection of crop from pest and people from wild animals. Put implements and seeds in place of worship for blessings.	
12	Jodla Panduga	🖂 in Sept	(Paderu)
		Relating to seeking protection of the crop from pest - put *Kasmika* stems in paddy field, also put some rice. Food and drink expenses per family about Rs.150	
13	Sama Kotha	🖂 in Nov	(Paderu)
		Relating to offering of new *Sama* crop before first consumption. About Rs.75 per family for food and drinks.	
14	Danyam Kotha	🖂 in Nov	(Paderu)
		Relating to offering of new wetland paddy crop before first consumption. About Rs.75 per family for food and drinks.	

Appendix O: Core Questions and Recruitment Note

Dear Participant,

Thank you for participating in this study. If you have questions at any time, please contact me, Tyrone Hall, at --- ---- ---- or - - - -@yorku.ca. My supervisor, Professor Anne MacLennan, can be contacted at - - - -@yorKu.ca. As noted in the Informed Consent Form, your participation is entirely voluntary. You do not need to answer questions you would prefer not to, or any at all, and you may withdraw from the study at any time with absolutely no repercussions. Confidentiality will be provided to the fullest extent possible by law. Thank you for your time and efforts.

Contextual Information

1. Name of Community:
2. Gender:
3. Occupation or role in the family:
4. Age:
5. Level of education:

Macro-case: Questions for negotiators and other members of the regional delegations

1. Describe the arc of the climate change debate in your region since the seminal Brundtland Commission?
2. Describe the region's current climate change policy?
3. To what extend are your core policy positions and the associated resources articulated in the Paris Agreement?
4. How does your region's current climate change policy position allow it to realize the individual, social and political changes necessary to manage its climate risks?
5. Explain how your region's climate programme support vulnerable communities, namely indigenous, agricultural (rural) and coastal communities?
6. How were your collective Intended Nationally Determined Commitments (INDCs) for the Paris Agreement developed?
7. How did you incorporate the perspectives of vulnerable communities in your INDCS, programs and campaigns?
    (a) What would you say were the highlights and challenges of those efforts?
    (b) How can this process be improved?
8. What indigenous and traditional practices have been or can be incorporated in your region's broader climate change activities and thinking?
9. Describe the principles, communication modalities, messages and channels that drive or are used in climate change activities aimed at indigenous and traditional communities in your country or region?
10. What does your region mean by climate justice, and how does it reflect the 2002 Bali Principles of Climate Justice?
11. Why is this narrative the region's preferred approach?
12. Is climate justice achievable without more explicit engagement with traditional and indigenous communities?

13. What's your region's policy position on tangible South-South initiatives such as SIDS-DOCK that acknowledge climate justice and spearhead innovative adaptation projects?
14. In what ways can your region both champion the notion of climate justice, and the broader Paris commitments and adequately meet the needs of its citizens who are most vulnerable to climate change?
15. How does your region enable climate justice within its borders?
16. What pattern of change do you anticipate for the realization of the Paris agreement?
    a. What are the likely implications for vulnerable communities?
    b. How can these implications be managed?
17. Describe your region's involvement with the 1.5˚C to Stay Alive campaign.
18. Do you consider the campaign a success?
19. What factors contributed to the success and/or failure of the campaign?
20. How did the campaign reflect the priorities and perspectives of indigenous and traditional communities in your region or country?
21. What lessons should be gleaned from the campaign, and how should those lessons be leveraged?

Micro-cases: Interview and Focus Group Questions

1. What does climate change mean to you?
2. How does it affect you and your community?
3. Who in your community would you say is most affected, and why?
4. How did you learn about climate change and its impacts?
5. Describe the changes that you believe are caused by climate change.
6. Is there anything you can do about these changes and climate change in general?
7. Please describe some of the ways you have been coping/managing or would like to cope/manage climate changes.
8. Where did these practices originate?
9. How long have you been using the strategies?
10. Why do you believe these actions have or will work?
11. Share with me some of the benefits that you have reaped from implemented these climate change responses?
12. Are these practices understood by public officials and NGOs that are working on climate change in your area?
13. Have you read, watched, listened or participated in any climate change campaigns or program(s) in your community?
14. If yes/no, why?
15. If yes, please describe the program, how did you participate and when?
16. Were there consultations before the programs or campaigns were introduced?
17. If yes or no, what are your thoughts on that?